

JAN 22 1923

SERIES 3—Vol. 6, No. 1

JANUARY, 1923

# AMERICAN JOURNAL OF OPHTHALMOLOGY

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*Annual Subscription Ten Dollars in Advance,  
Single Copies One Dollar.*

**PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY**  
**7 West Madison Street, Chicago, Illinois.**

Entered as Second Class Matter January 1st, 1918, at the Post Office, Chicago, Ill., under the act of March 3rd, 1879.

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# AMERICAN JOURNAL OF OPHTHALMOLOGY

Vol. 6

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No. 1

## THE MISTS AND HALOS OF GLAUCOMA.

ROBERT HENRY ELLIOT, M.D.

LONDON, ENGLAND.

These subjective symptoms of glaucoma are of practical importance in calling attention to the disease and indicating its progress. They are closely associated symptoms arising from the diffraction of light. The halos belonging to glaucoma arise in the cornea and must be distinguished from those due to the crystalline lens or produced by air bubbles or cells on the corneal surface. This paper reports a careful study of the differences observable between these different kinds of halos, which are all considered diffraction phenomena. Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, April 20, 1922.

A very great interest attaches to these subjective symptoms of glaucoma for a number of reasons: (1) They are often the earliest evidence of the disease to attract a patient's attention, and therefore to lead him to seek medical advice. (2) They are so arresting that the mention of them is at once sufficient to awaken a surgeon's suspicions and to put him on his guard. (3) Their frequency and the intervals at which they have been noticed by the subject furnish valuable data as to the recurrence of congestive attacks, and so throw much light on the rate of progress of the disease. (4) Once a diagnosis of glaucoma has been established, they constitute the most delicate, and at the same time the most easily appreciated evidence of the onset, duration, and frequency of fresh congestive attacks. (5) It is of the utmost importance to distinguish between the true halos of glaucoma and the spurious phenomena which may be so easily mistaken for them.

**FIRST PRINCIPLES.** When light, in passing thru a translucent medium, is interrupted at a large number of points by the presence of evenly sized discs, globules, or granules, differing in light transmissibility from the medium in which they lie, *diffraction* phenomena will be produced; and the observing eye consequently sees rainbow colored circles, shading away from violet or blue on the inside, thru green and yellow to orange and red on the outside. These halos

can be equally well observed when circular discs or apertures of a more transparent nature lie in a less translucent medium. We can illustrate our subject in a variety of ways:

If we take a sheet of glass, breathe on it, or steam it at the spout of a kettle, and hold it up between our eyes and a source of light, we are at once aware of rainbow rings surrounding the latter. These are due to the vast number of tiny droplets of moisture of comparatively even size which have been deposited on the surface of the plate. Again, if we dust the surface of a glass plate with lycopodium powder in a fine layer and hold this up to our source of light, we get a number of brilliant rainbow rings, one outside the other, each complete in itself. A still more beautiful experiment is to draw a drop of blood from the finger, and to insert it in the conjunctival sac; if the eye be then gently opened or closed once or twice, and the layer of blood is thus evenly distributed over the cornea, intense vivid halos of the spectral colors will be very readily seen.

It has been pointed out above that in order to produce these interesting diffraction phenomena, the particles which interrupt the passage of light must not only be very numerous, but also very uniform in diameter. There is a further point of great interest—the halos produced by different media differ not only in their brightness but also in the angular measurement which they subtend; and this angular measurement is deter-

mined in each case by the diameters of the tiny discs or particles which are responsible for the diffraction phenomena; the larger the discs, the smaller the halos they produce and vice versa. So exact is this relation, that a physicist who knows the angular measurement of a halo, can, by mathematical formula, unerringly calculate the average diameter of the discs involved. We shall return later to a consideration of the simple formula by which we can calculate the angular diameter of a halo, provided we know its actual diameter and the distance from which it is observed.

Up to this point we have confined ourselves almost entirely to the consideration of the "halos of glaucoma," to the almost complete exclusion of the "mists," which have shared our title with them. Of the latter there is less to be said, but we must take them more or less together. For the purpose we must first discuss the role played by the cornea.

**THE CORNEA.**—Both the mists and the halos of glaucoma are to be attributed to an alteration in the condition of the cornea. In the early stages of the disease, these phenomena are transient and rapidly come and go. Later on they assume a more permanent character. But even then they disappear when the condition of high pressure is relieved. They are cloudiness of the cornea, resulting from the presence of congestion of the perilimbal blood supply, and are associated with a pink or red circumcorneal ring, and, amongst other things, with the dilatation of the pupil on the same side. Halos appear to be an even more delicate test of a rise in intraocular pressure than mists; for patients will tell you that they are aware of the former when the latter are totally absent. It is probable that it requires more intelligence and more highly trained powers of observation to recognize faint mists than faint halos.

Morax has gone so far as to suggest that the presence of the halos may be the only sign present in a case of glaucoma. With this view I cannot agree; I have never yet seen a patient in the

halo stage who did not present other stigmata of raised intraocular pressure. On the other hand, it is not uncommon to meet with glaucoma patients whose only complaint is that from time to time they have seen colored rings around lights; and in whom no other evidence of glaucoma can be elicited by even the most careful examination. The explanation is a simple one: The accesses of tension are very transient, and have so far failed to leave definite evidence behind them, tho an examination at the time would probably not have failed to reveal circumcorneal congestion, dilatation of the pupil, a slight reduction of central visual acuity and light sense, and a more or less pronounced orbital neuralgia or headache, not to mention a rise in the tonometric reading.

In explanation of the presence of the mists and halos, two causal factors have been cited: (1) an overstretching of the cornea as a result of an increase of intraocular pressure, (2) an actual edema of the membrane. The former is supposed to act by altering the refractive power of the fibrils of the cornea; the evidence in favor of its existence as a factor has been held to lie in the very great rapidity with which the symptoms come on and pass away, as the ocular tension rises and falls. It has been contended that such rapid transitions could not depend on a change such as edema, which must necessarily take some time to declare itself, or to disappear once it is present. This argument does not seem to be a very strong one, especially when we remember that it was originally advanced in the days when the tonometer was not in habitual use, and when, so far as the majority of surgeons were concerned, this instrument was not used at all.

The discovery of a rise or fall in tension does not by any means synchronize even now with the actual rise or fall, and the difficulties of our predecessors in this direction were obviously much greater than our own. There may be, and undoubtedly often is, a rise in the pressure within an eye long

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before we discover its presence. This obviously makes it very difficult to say how long the pressure has been present at the time when we first recognize it as a result of the patient's complaints of mists or halos. Without denying that overstretching of the cornea may be a factor, we should probably be well advised in not laying much stress upon it, especially as Fuchs has furnished us with a simple anatomic explanation of the phenomena in the edema which he has found in the cornea in cases of congestive glaucoma. (See Figs. 1 and 2.)

This edema is confined to those of the corneal lamellae which lie immedi-

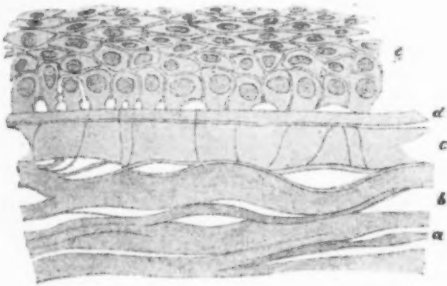


Fig. 1.—Changes in the anterior layers of the cornea in acute glaucoma due to edema. (x441.) e, corneal epithelium; d, accessory Bowman's membrane, droplets are seen between this membrane and the epithelium; c, Bowman's membrane; a, lamellae of cornea, separated by drops (b) of edema. (Fuchs.)

ately beneath Bowman's membrane. Between these are found open spaces due to the accumulation of fluid. In addition the layers of the corneal epithelium, and especially the deeper layers, share in the edematous condition. Cellular elements can be seen to break thru the membrane of Bowman, and to form subepithelial masses. This invasion takes place alongside of the tiny nerve filaments, which traverse the membrane on their way to their distribution in the epithelial layer (Fig. 2). The dullness of the cornea in these cases is to be attributed to two factors: (1) A disturbance of the transparency of the membrane, due to the exuded fluid having an index of refraction different from that of the normal tissues of the part; (2) an actual irregularity of the epithelial surface, as a result (a) of certain cells being

pushed up more than others by the fluid beneath them, and (b) of some of the surface cells being actually destroyed by the edematous process, minute inequalities being thus left.

It seems probable that the fact that this edema makes its way, to some extent at least, along the channels in which the nerve filaments lie, has some influence on the *anesthesia* of the cornea, which is so prominent a symptom of glaucoma. In the early stages of the disease the corneal edema may be so slight as to manifest itself only by the

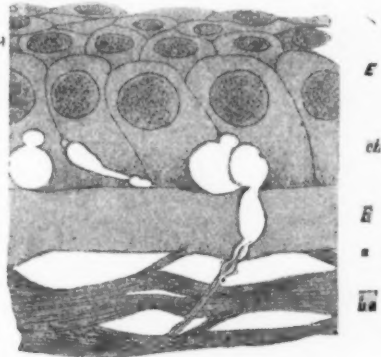


Fig. 2.—Details of the edematous lesions in the corneal epithelium. (x697.) Bowman's membrane traversed by the nerve canals which have been extended by edema. E, corneal epithelium; cb, the basal epithelial cells with edematous spaces; lc, superficial layers of the cornea. (Fuchs.)

presence of mists and halos, or of halos alone. On the other hand, it may give rise to distinct haziness of the corneal surface, which can be well seen by combining the use of a loupe with that of oblique illumination. The beam of light employed should be focussed not on the surface of the cornea but a little below it. The haziness of the cornea is usually described as presenting a uniform, ground glass like appearance, which is most intense towards the center of the membrane and fades peripherally.

It remains to be mentioned that the mists of vision met with in glaucoma are not to be ascribed wholly to corneal changes; on the contrary, as pointed out by Morax, they are due in some, and possibly in a large measure, to the interferences with the retino-choroidal circulation which is brought

about by sudden and transient rises of the intraocular pressure.

The subjective aspect of the two symptoms we are considering now claims our attention, and before dealing with each separately, we would pause to make a note of the psychological interest that attaches to the mental attitude of different people towards these phenomena. Some patients speak of them with amused interest, whilst others are inspired by them with deep alarm.

The *indistinctness of vision* is variously described. Some speak of a cloudiness of the sight, some of seeing as thru a haze or smoke, whilst others state that it seems as if there were a fog or mist in the atmosphere; the more intelligent subjects sometimes volunteer the statement, that when the attacks occur, they are obliged to ask their friends whether the day is misty or not, before they are certain that the phenomenon is subjective. Morax has met with patients in whom the cloudiness of vision takes the very definite form of an impression that the atmosphere is full of soot particles. He also draws attention to the fact that in some cases the sensation of mistiness of vision is quite unassociated with any evidence of the reduction of visual acuity, as shown by test type examination.

These "mists" are often most troublesome in the early morning, and pass away as the day goes on, frequently after a few hours or even less. This observation is one of great interest, in connection with Professor Thomson's contention, that fluid is removed from the eye during the waking hours as a result of the pump like action of the iris and ciliary muscles acting on the scleral spur. Such an action must obviously cease, or nearly so, with the advent of sleep. It would therefore suggest itself that sleep would be bad for the glaucomatous patient, whereas we know it is good; but, clearly, another factor comes into the case, since sleep quiets the circulatory system, and serves to restore its normal condition, which congestive glaucoma so severely disturbs. The bal-

ance is therefore in favor of the eye, since the tendency to venous congestion is removed.

The case may, however, be quite different, when we are dealing with a globe which starts the night not unduly congested, but which is experiencing the difficulties inseparable from a gradual but steady increase in the growing obstruction to the excretion of fluid. The long sleeping hours continuously deprive the organ of its accustomed help from the pump action of the muscles, and so tend to aggravate the want of balance between secretion and excretion. With the advent of morning comes muscular activity, the forced removal of fluid by the pump action of the ciliary and iris muscles, and the disappearance of the difficulty. As a result the "morning mists" vanish in a short time.

It is well known that the mists of vision and the other signs which we associate with early glaucoma, are met with in some patients not in the early morning but later on in the day, and especially in the afternoon or evening. If we inquire into the patient's habits, we find that the attacks synchronize with periods of greater or less exhaustion, and that they are often relieved by food, rest, or diversion. A point of considerable interest, and also of diagnostic significance, is suggested by a consideration of the above facts: The occurrence of "morning mists" can best be explained by supposing that there is a primary obstruction to the excretory channels of the eye, and that vascular disturbances are of secondary importance. On the other hand, the troubles coming on in the afternoon or evening would seem to point to the onset of vasomotor disturbances associated with exhaustion of the nervous system as being the prime cause of the attacks. To put it in other words—in the first case we have to do primarily with an obstruction to excretion, and in the second with a tendency to ocular congestion. The distinction between simple and congestive glaucoma, and the close interrelation of the two conditions are here most interestingly suggested.

The *halos around lights* can, I believe, always be seen whenever the mists are in evidence, provided that the conditions present are favorable for their observation; which as a rule they are not. In practical experience the colored rings are best seen by the patient when he looks from a distance at a bright light in the dark, and especially at an electric arc light. Two colors at least are usually discernible, an inner blue or violet, and an outer yellow, reddish yellow, or red; a green or greenish yellow band is often seen between them. It is said that the red hues are most in evidence around candle and gas flames, whilst the blue predominate round electric lights. A double halo is said to be sometimes observed, one set of rings lying within the other.

It seems not improbable that, under laboratory conditions, the observation of this phenomenon would be often elicited. Observers have differed widely as to the size of the glaucomatous halo. Sheard gives it as from  $10^{\circ}$  to  $12^{\circ}$ . Others have furnished much lower measurements down to those of from  $2^{\circ}$  to  $2.5^{\circ}$ . The author has recently taken considerable trouble to measure such halos, and has found them to vary from  $6^{\circ} 50'$  up to  $11^{\circ} 54'$ . An interesting feature is that they are not even constant in the same eye at different times. We shall return to this subject a little later on.

Another point of interest is that some of the glaucoma patients complain that the halos are dark blue, right out from the center, with only a fringe of green, yellow, and orange-red. This would appear to be due to the difficulty these patients experience in seeing the central ciliary corona of yellow, which is so obvious to the normal eye as surrounding the source of light. It is suggested that the misty cornea so far diminishes the light admitted, that the central area appears dark and therefore indistinguishable from the inner ring of blue. (H. H. Emsley.) It is well at this point, to make it clear that all measurements of halos, given in this work, are taken to the outer extremity of the orange-red ring.

We next ask ourselves whether it is possible to explain the varying diameters of the glaucoma halos on a strictly physical basis. It has already been pointed out that the angular diameter of such a halo depends upon the size of the particles which are responsible for the diffraction phenomena. If we accept the view that the glaucomatous halos are a product of edematous changes in the cells of the corneal epithelium or endothelium, it seems possible that alterations in the size of the droplets formed under the pathologic condition present (edema) may determine a variation in the diameter of the rings seen. We should expect, if this hypothesis is true, that the glaucoma rings would be found to vary according to the condition of the cells which produce them. Thus if these cells were separated from each other by small drops of edematous fluid, we should expect the resulting halos to be large in diameter; whereas, if these droplets coalesced, and so became individually larger, we should anticipate that the measurements of the halos would diminish. It naturally suggested itself that this might furnish an indication of the stage that the glaucomatous process had reached, and the matter has been carefully studied from this angle; but, perhaps due to the limited number of observations made, it has not so far been possible to come to any definite conclusions.

**THE PERSISTENCE AND PROMINENCE OF THE HALOS.**—The persistence of the symptom, and the inconvenience it causes the patients, both vary greatly in different cases. At times the halos are so faint that they have to be carefully looked for, whilst on other occasions the same patient finds that "every tiny flickering flame in the fire-light is iridescent with colors." No source of light is then too feeble or too tiny to escape a rainbow crown. It would appear that this condition is especially likely to be established on damp misty days, tho it is difficult to say why this should be so. As has already been pointed out, the glaucomatous halo is a manifestation, and

sometimes a very transitory one, of an edema of the cornea produced by intraocular pressure. When the pressure is relieved, the edema disappears and the halos are no more seen. This very fact explains the comparative rarity with which we see patients in the halo stage in our consulting rooms. Most frequently we get a history of the rings appearing for short periods, when the patient is tired, and passing away when he gets a meal and rest; it is only when he comes to us in the course of a congestive attack that we can take him into the dark room, and pin him down to a recognition on the spot of this phenomenon. What is of much greater importance in such instances is, that we should be able to demonstrate to him what we mean by "halos," and so prevent him from worrying himself needlessly over phenomena which are of no real importance, but which he may mistake for the pathologic manifestation.

This can be done by getting him to look thru a glass plate that has been steamed or breathed on, at a small, bright source of light. He will get a still more vivid idea of the halos thru one on which lycopodium has been dusted. Such a plate can be kept for constant use in the dark room, if it is prepared in the following way: A small negative glass or lantern slide is washed clean of film, and is dusted over with lycopodium powder, after first coating it lightly with retouching medium; all excess of the powder is shaken off, and as soon as the medium dries, another similar glass plate is placed over it and the two are bound together with lantern slide binding strips.

Once a patient really understands the nature of the halos which have a significance in glaucoma, it is much easier to find out whether he really sees them or not. Our next task is a consideration of the various conditions which from time to time are mistaken by nervous people for halos:

(1) On looking at a gas light, or other flame at night—it may be seen to be surrounded by a golden haze, made up of radiating luminous beams, some of which are drawn out to a consider-

able length. (Fig. 3.) Very careful observation of these beams may reveal a certain spectral element in them, but this is usually very difficult to appreciate, is confined to individual beams, and is never seen by healthy eyes in the form of definite complete colored rings.

(2) Nervous patients who have heard of the glaucoma halos some-



Fig. 3. Corona of light around a flame. This is sometimes confused with the colored halos of glaucoma. It is not a pathologic phenomenon. (Morax.)

times persuade themselves that they are seeing them. Such people, as a rule, merely require reassurance in order to make them forget their troubles. In this connection it is interesting to record the frequency with which we encounter undue nervousness in our glaucomatous patients. This is no doubt partly due to their knowledge of the terrible nature of the disease, and to the mental strain consequently inflicted upon them, but it would almost seem that, as a class, they are unusually nervous.

(3) Nervous patients sometimes mistake the scintillating scotoma of

migrain for glaucoma halos (Morax). The differential diagnosis is very easily made, even apart from the fact, that the former trouble continues even when the eyes are shut, whilst the latter is only in evidence when a patient is looking at a light.

(4) The same point in diagnosis holds for the colored rings which many nervous patients see when they close their eyes in the dark, especially after a hard, and overtiring day's work. The author has known medical men seriously alarmed by these phenomena.

(5) Patients whose corneas have become temporarily clouded, as the result of some caustic medical application, often complain of very vivid halos, which pass away when the membranes clear after a night's rest. In Madras, where acute catarrhal conditions are very common, it was formerly the custom to treat these by painting the lids with a 2 per cent solution of silver nitrat; after doing so the corneal epithelium was seen to be cloudy as a result of the action of the drug, and the author was struck with the frequent complaints made by patients, that after each such painting, "the vision was misty and bright lights were seen as if surrounded by halos." He was able to confirm this observation on himself. Treacher Collins has drawn attention to the fact that by dropping a solution of the alkaloid erythrophlein (African arrow head poison) into the eye, a similar appearance of rainbows around lights can be produced.

(6) If a bright light is looked at in the dark thru a steamy glass, colored halos are well seen. This may give rise to apprehension in the minds of those who know the importance of this sign. Anyone who wears glasses may see this phenomenon on a foggy night, owing to moisture condensing on the surface of his spectacles. Again, the rings may be seen when looking thru a steamy plate glass window, from the dark outside, at a bright light far back in a big room. The author specially noticed this when passing the windows of shops lit by a single light at a time when illumination in

London was restricted. In either case some alarm may be occasioned, but the matter can be quite simply put to rest, if the spectacles are wiped, or if a part of the window which is not steamy is looked thru.

(7) The evidence before us would lead to the inference that the rainbows of glaucoma are due to an interference with the normal condition of the cornea, and not to any change in the lens. This view is supported by the fact that halos are seen by those aphakic eyes which become glaucomatous. At the same time, we must recognize the possibility that changes in the lens may give rise to phenomena indistinguishable from those associated with high tension of the eye. Indeed, Fumiatzew has quite recently claimed that rainbow circles round lights can be seen in the early stages of cataract, just as readily as in glaucoma. In order to make a differential diagnosis between the two, he advises the surgeon to place before the patient's eye a diaphragm, carrying a hole of the same diameter as that of the patient's pupil under daylight illumination. If the halo is due to nuclear cataract, it will then disappear, but will return again in an intensified form, if the diaphragm is suddenly removed, whilst the patient is still watching the source of light; the latter phenomenon is due to the pupil being caught momentarily dilated. On the other hand, if the halos are due to glaucoma, they are unaffected either by the use of the diaphragm or by alterations in the illumination. If the opacities in the lens are peripheral, the placing of the diaphragm before the eye dissipates the rainbow, which returns with increased brilliancy when it is again taken away. Such at least are Fumiatzew's statements on the subject. In the next paragraph we shall deal with some results of the large amount of research that has recently been devoted to this subject, and which has thrown a possibly new light on it.

(8) It has been shown that the normal eye can habitually see colored rings around bright lights in the dark,

once its attention has been drawn to them. These halos have been carefully studied by a number of observers (Druault, Morax, Brudenell Carter, Chance, Sheard, Schiötz and others). Carter believes that they are more commonly seen in the aged, and Morax and Druault associate them with dilatation of the pupil. The subject derives an added interest from the indisputable fact, known to many of us, that certain of our patients will see halos when their pupils are artificially di-

From the practical point of view the differentiation is not difficult: (1) The physiologic halos are, in the great majority of cases, at least, far less vivid, and far more difficult to recognize than the glaucomatous ones. (2) The former are always present if looked for under suitable conditions, whilst the latter are either only occasionally present, or if constant, are accompanied by other manifestations of high tension which leave the diagnosis in no possible doubt. (3) The

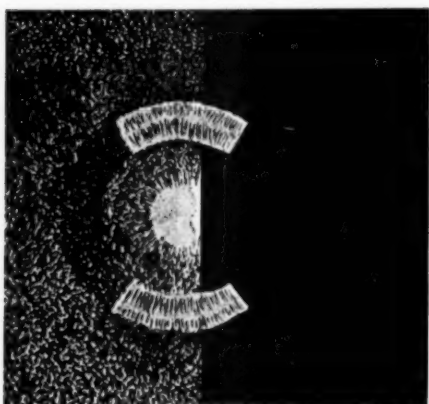


Fig. 4.—Diagram to show Druault's experiment designed to distinguish between the physiologic and glaucomatous halos. The black screen is moved from right to left; according to Druault two sectors of the ring persisted in the position shown above, the rest of the ring being obliterated, thus indicating that the halo is physiologic. (Morax.)

lated, and this in the entire absence of any indication of a rise in ocular pressure. The possibility that this phenomenon may lead to a serious misunderstanding, and may damage a professional reputation, must always be borne in mind. In contrast to the ignorance of the symptoms of glaucoma displayed by some medical men, it is extraordinary that members of the public should often know so much about them as they do. Many of them are well informed about halos, and it is essential that the specialist should be on his guard in this matter, both for his own sake and for that of his professional colleagues. If he can show a suspicious patient that his halos are physiologic and not glaucomatous, he will often do a very valuable piece of work.

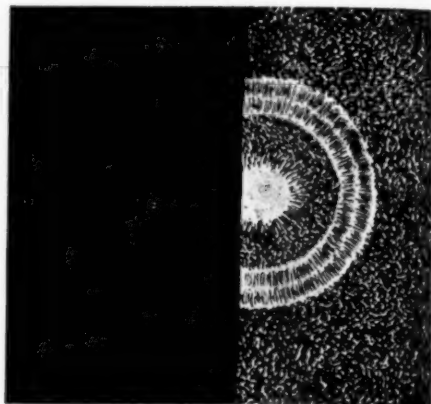


Fig. 5.—Shows the effect of passing a straight edged screen in front of an eye which is looking at a source of light thru a plate covered with lycopodium powder.

angular diameter of the physiologic halos measure  $7^\circ$  to the outer edge of the orange-red. This figure is constant, thus furnishing a striking contrast to that for the glaucoma rings, which, as we have already shown, may vary from under  $7^\circ$  up to nearly  $12^\circ$ .

Druault has suggested a test which Morax claims to be of considerable value: The eye under examination is gradually covered by a straight-edged screen (a piece of darkened cardboard); this is brought in from the side until half the pupil is shut off; when this has been done, part of the colored ring is still seen, but this is not the part which one might have expected, for the upper and lower quadrants of the luminous circle remain, whilst those to the right and left disappear. (Fig. 4.) He takes this to indicate that the halo is due to dif-

fraction phenomena produced by the lens fibers at the level of the pupil. If, on the other hand, the halo is a true glaucomatous one, and therefore produced by changes in the cornea, the whole ring gradually disappears, fading away in its entirety.

So important did this subject appear to me, that I sought the assistance of Mr. H. M. Emsley, B.Sc., of the Northampton Polytechnic Institute,

grating in which the meshes have a radial arrangement, presents certain peculiarities which are capable of a simple physical explanation. Figure 6 shows such a radial grating diagrammatically.

If you will take a sheet of paper and pass it across the diagram in the direc-

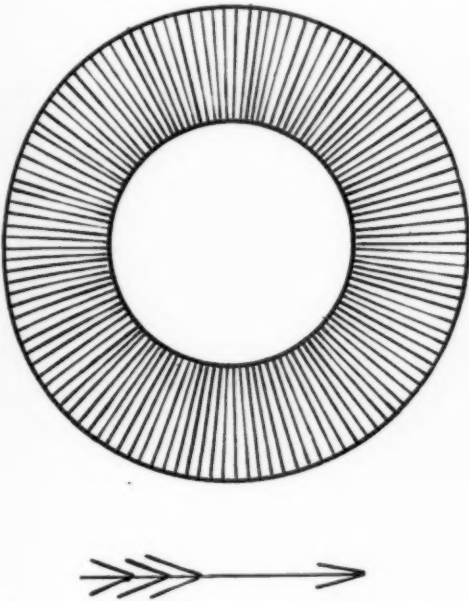


Fig. 6.—Diagram showing a radial grating such as that found in the human lens.

Clerkenwell, who with his colleague, Mr. F. F. Fincham, has kindly made a number of experiments. They found that a stenopaic slit gives better results than the straight edge screen.

In order that you may better appreciate their work, certain preliminary matters must first be dealt with: It has already been stated that colored rings may be produced by diffraction, not only when the light, passing through a medium, is broken up by a number of particles, but also and equally well, when it has to traverse a fine grating, whose mesh is perforated by a number of tiny apertures. Such gratings may be of various kinds, and the phenomena observed differ a little accordingly. A radial grating, i. e., a

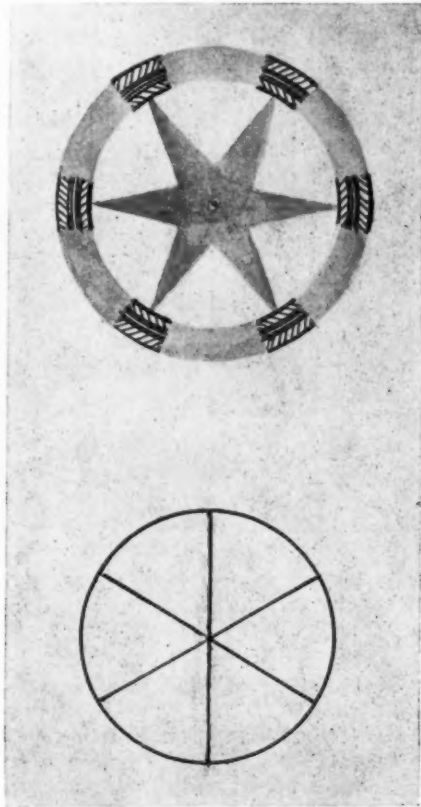


Fig. 7.—Lens halo observed by human eye and relative position of retinal star—diagrammatic (Emsley and Fincham).

tion of the arrow (along the horizontal rays of the figure), you will observe that radii from every angle of the 360 remain exposed until the edge of the paper has covered more than half of the circumference of the circle. A ring spectrum formed by such a grating would not be affected except in intensity. As soon, however, as the screen has passed the central position, it has begun to cut off the vertical and nearly vertical lines. The further it moves across to the left, the more of

these does it cut off. The optical effect of this is that there would be no dispersion in the horizontal meridian; the horizontal part of the ring disappears more and more; its vertical components above and below are alone left and become gradually smaller until, just before the extreme edge of the radial grating is reached, there is a narrow band of halo above and below. This too disappears when the screen reaches the edge of the circle.

It has long been recognized by all competent observers that the arrange-

outer orange-red limit. This is of interest, since a number of previous observers, including Gullstrand, Koeppe, and Tscherning, have agreed that the halo produced by the human lens has the above measurement, the observation being consistent with the known breadth of the lens fibers.

(2) Given certain favorable conditions, for observation—only obtained in a laboratory—they found that this ring is not truly circular, and is not equally brilliant all round. On the contrary, six equidistant portions,

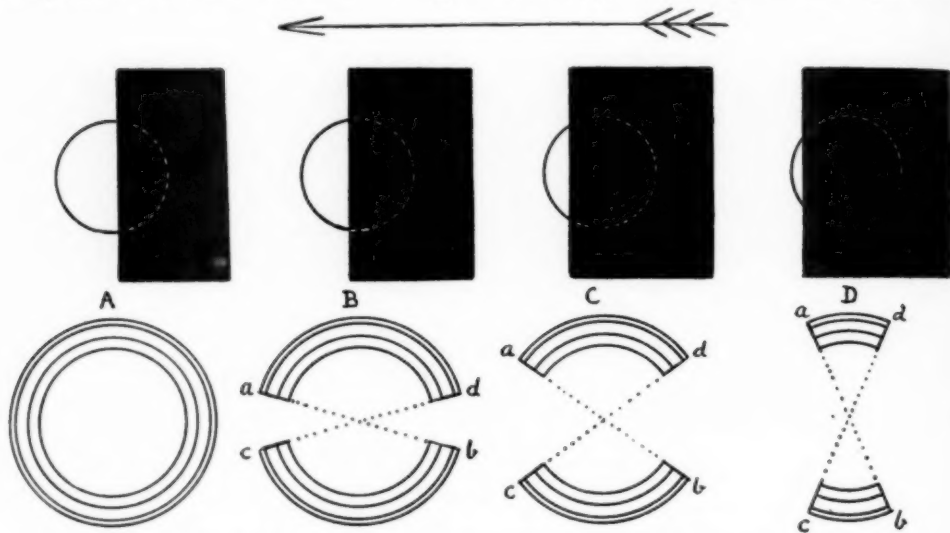


Fig. 8.—Straight-edged screen test moved in direction of arrow. (Emsley and Fincham).

ment of the fibers in the cortex of the lens is such as to cause this structure to function like a radial grating, up to within a short distance of the center of the pupil. A more widely dilated pupil, exposing a greater area of the radial grating, would more easily lead to the manifestation of the physical phenomena we have just been describing.

Working from the above basis, Emsley and Fincham studied the physiologic halos which the normal eye can habitually see under favorable circumstances around bright lights in the dark, and in doing so they made a series of very interesting observations:

(1) They found that the most prominent and easily seen halo subtended an angle of about  $7^\circ$  to its

each of an angular measurement of about  $20^\circ$ , stand out more clearly than the remainder. Figure 7 shows that these bands of color alternate with the rays of the lens star of the eye, the latter being fixed by placing a minute source of light near the anterior focal plane, thus throwing a shadow of this star on the retina. A similar diffraction pattern was obtained by using the crystalline lens of a sheep, and also by using the anterior segment of a fresh bullock's or sheep's eye. Here again, we have another indication that the halos we are studying find their origin in the radial structure of the lens.

(3) When the pupil aperture was less than 3 mm. in diameter, no halo was seen. They point out that, under

these circumstances, the light entering the eye covers about 2.5 mm. diameter on the crystalline lens. With a pupil of 3 to 5 mm. in diameter, the halos could be seen, whilst a maximum dilatation greatly increased the intensity of the colored rings observed and diminished the relative effect of the ciliary corona. They interpret this as an indication that the radial grating effect of the lens ceases, or at least greatly diminishes, towards the axial center; the observation is a confirma-

tion we are now considering, radii from every direction still remain exposed on the radial lens grating. Once the screen has passed the center of the pupil, it commences to cut off the vertical rays and those nearest to them, with the consequence that, as already pointed out, the horizontal part of the ring commences to disappear. (Fig. 8 B.) As the screen travels further on its way, it shuts off still more rays, and consequently cuts off still more radii; the portion of ring left thus

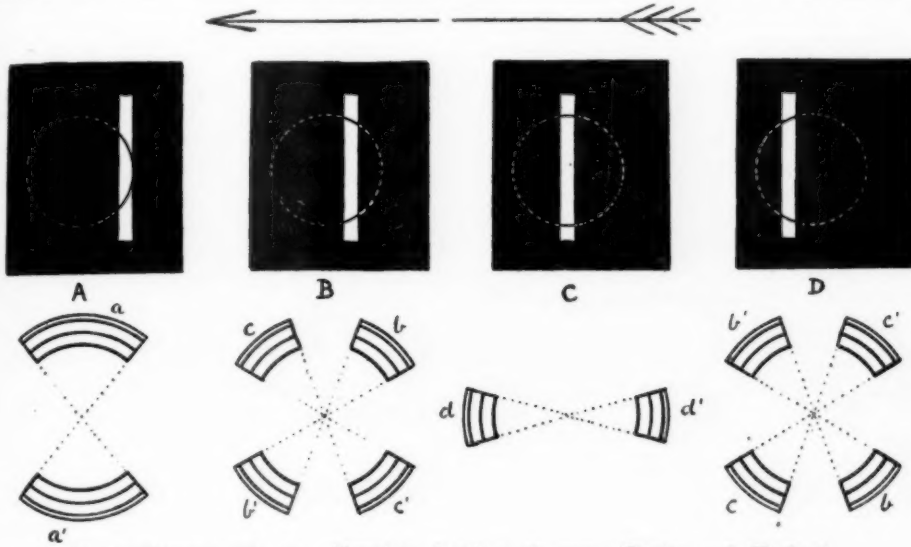


Fig. 9.—Stenopaic Slit test. Moved in direction of arrow. (Emsley and Fincham).

tion of the findings of earlier observers.

We now come to the practical application of their work, and must consider in turn Druault's test with the straight edged black screen, and a modification of it with the stenopaic slit.

(4) Druault's test, as has already been pointed out, consists in the passage of a black screen, with a vertical straight edge, across the line of sight in a horizontal direction and close to the pupil. Figure 8 shows the successive positions of the screen, and the results obtained in each case. Until the screen edge has reached and passed the center of the pupil, the observing eye sees a complete colored ring (Fig. 8A.) A reference back to Figure 6 explains this phenomenon, for in the

dwindles (Fig. 8 C.) until the extreme left edge of the pupil is alone exposed, with the result that the radii in the neighborhood of the horizontal meridian are alone in action; a narrow vertical band of colored rings above and below is all that remains of the circular halo. The next moment, even this disappears as the screen edge occludes the whole pupil.

Thruout the experiment, the halo has been steadily losing its brilliancy, due to the fact that more and more elements of the radial grating are being shut off; but there is an essential difference between the phenomena above described and those seen by the glaucomatous eye, in which, as Druault points out, the ring remains intact thruout its circumference, tho it gradually fades in brilliancy, owing to the

diminution of the light admitted as a result of the onward movement of the screen.

A last observation remains to be recorded: If you will look at the illustrations of the halos in Figure 8, it will be obvious to you that, as the observed amount of ring diminishes, it must do so by the approximation as it were to each other of the lines *aa* and *bb*, which close on each other by a scissor action, one moving clockwise and the other counterclockwise. It can be definitely noticed in different eyes, that the rate and distinctness of movement of these two edges vary widely. Emsley and Fincham believe that this can be easily explained either by a slight eccentricity of the pupil as compared with the center of the radial grating, or by a difference in the perfection of the grating at different parts of the lens circumference.

(5) These two observers found that still more marked results were obtained when they substituted a stenopaic slit (1 mm. wide) for the dark screen previously used. Figure 9 shows in the upper line successive positions of the slit in front of the pupil, and in the lower line the corresponding appearances of the observed halo. Let me premise what I have now to say by the observation, that each one of their findings shown in Figure 9 might have been foretold by anyone studying the radial grating shown diagrammatically in Figure 6. Will you note the difference between this and the last experiment? There you were studying anything up to the exposure of the half or more of the pupil, here you are confining yourself to a *restricted* area of horizontal, vertical or more or less oblique radii. This at once explains the difference between the behavior of the halos in the two cases.

Let us take the positions in turn: In A, when only a portion of the border of the pupil is exposed, the radii in the neighborhood of the horizontal meridian are alone able to transmit light. The consequence is that two segments of color, one above and one below, and both of them close

to the vertical meridian, are all that are observed. When in B, the slit has moved on to uncover certain of the oblique radii, it has shut off those that are horizontal and has not yet reached those that are vertical. For convenience sake, we may speak of the radii near the vertical or horizontal meridian as being vertical or horizontal respectively. The result of the fresh position taken up by the slit is that we have now four portions of halo in two diagonal meridians. Moreover, as the screen is moved across from the edge of the pupil (A) to the new position (B), the vertical segments of the halo above and below can be seen to split up into these two new bands which wheel away from each other in a diverging manner, until as observed in C, they meet in the horizontal meridian, once again to form a single band at each end of the meridian. As the screen moves on towards the left border of the pupil, these horizontal segments of the halo break up again, each into two segments lying in oblique meridian. As the movement of the slit passes across the pupil to expose the horizontal radii once again—but this time on the opposite side of the diagonal—we return to the condition with which we started in Figure A, of two segments of halo at opposite ends of the vertical meridian.

As the test is carried out, the patient may tell you first, that he sees two bands of halo, one above and the other below, in the vertical meridian; then these break up and wheel around until the advancing portions meet in the horizontal meridian, and on again to break up once more, and finally, to reunite in the vertical position. On the other hand, Emsley and Fincham have found that the four portions into which the halos break up in the slit test, are seldom seen with equal clearness by any given eye. The wheel movement is always there, but the distinctness of the segments of halo and of their movement, is considerably greater in one meridian than in another. The consequence is that the colored band is often described as moving in only one direction, either clock-

wise or counterclockwise. The two observers explain this latter fact, as before, by the supposition that the pupil is probably often not truly central to the radial grating of the lens, or that the grating is not equally active over the whole area exposed, with the result that the brightness of the halo is accentuated at right angles to the meridian in which the radial grating is most fully uncovered, or most perfectly in action.

(9) Transient halos around lights are also often complained of by those who suffer from conjunctivitis associated with much mucous discharge. Wiping or washing away the offending flake or layer of mucus from in front of the cornea, relieves the symptom, and shows what was responsible for it. The current explanation of this phenomenon, that the colored rings are caused by the eye being lined by a layer of mucus, leaves something to be desired, for there would seem to be no valid reason why such a lining should produce the effect in question, unless it is lined by particles capable of producing diffraction phenomena. I would suggest for your consideration two possible sets of such particles, (i) air bubbles and (ii) masses of leucocytes or other cells. We will take these in turn:

(i) *Air bubbles.* If a drop of white egg is placed between two slides and squeezed out; a clear transparent slide is produced. If, however, the two glass covers are freely rubbed on each other, the film of white of egg is broken up by a number of tiny air bubbles, and on again looking thru the contrivance, prismatic colors are seen. These attain their maximum brilliance wherever the bubbles are smallest and most numerous, and fade away where they are large and scattered. The observation can easily be confirmed with the aid of a low power microscope. Other viscid fluids, such as certain oils, give exactly similar results. A drop of egg albumin or oil instilled into the conjunctival sac fails to give rise to the appearance of halos, nor is it found possible to break up the fluid sufficiently to cause this phenomenon, tho

it is possible that this might be done in a laboratory, with the aid of suitable apparatus. On the other hand, it seems not unlikely that the movements of the lids over the eyeballs may have precisely the same effect on the mucus lying between them as those of the glass slides have on the egg albumin. The rarity with which patients see halos thru mucus suggests that the exact conditions favorable to the production of these phenomena are not often met with, but there is an interesting observation in favor of the hypothesis toward which we are leading up. In certain patients with chronic catarrh, one notices, on everting the lids, the presence of small air bubbles in the conjunctival folds. An examination under the microscope of a drop of mucus from such an eye shows it to be full of tiny air bubbles, closely resembling those seen in the rubbedup white of egg film. The same thing may be observed after rubbing an ointment into the eye. The above facts are obviously suggestive.

(ii) *Cell masses in the mucus.* On a recent occasion I had the opportunity of examining the mucus of a patient who was troubled with chronic catarrh, associated with the seeing of colored rings. The secretion from his eyes revealed clumps of mucus, in which were embedded masses of leucocytes, most of which proved to be polymorphonuclear in type. It is obvious that when one of these masses crosses the line of sight, it will be likely to give rise to diffraction phenomena, and so to cause the patient to see colored rings around lights. The action is in fact strictly comparable to that of blood, which when introduced into the eye gives rise to very vivid rainbow phenomena.

REVOLVING HALOS.—It would seem to be a matter of some interest to mention an unusual case recorded by von Graefe of a workman, suffering from glaucoma, who "from time to time had *blue spectra* before his eyes; he had seen rainbows around the candle, and when he fixed an object whilst in this state, or exposed the eye to the light, the color spectra revolved like a wheel,

and the sight became so dim that he could no longer recognize even large print. After a night of good sleep, vision was always perfectly acute again."

I have quite recently seen a case which is suggestive of the above. A very intelligent patient, who at one time had been much troubled by colored halos, mentioned that a particularly annoying feature of them had been their tendency to revolve. On inquiry I elicited from him that he saw a distinct ring composed of a number of colors, with blue on the inside and reddish-yellow on the outside. This ring did not rotate like a cartwheel but appeared to be in active movement around and at right angles to its own circumference. From his description I gathered the mental picture of a large ring of colors, like an inflated motor tire, which was in constant movement. But the wheel did not spin on its own axis; instead of that, it appeared to rotate around an imaginary circular axis occupying the center of the tube. He was not clear whether the colors changed place, but thought they did not. It seemed as tho the movement took place thru the colors rather than of the colors.

I have also met with a patient suffering from asthenopia, with no suspicion of glaucoma, who is much troubled by the revolution of a wheel of light before his field of vision. Moreover, an oscillatory or rotatory movement of the scotoma is known to be a symptom, tho fortunately a rare one, of eclipse cases. With regard to the blueness of the spectrum in von Graefe's case above mentioned, you will find, if you experiment with a plate glass covered with different depths of steam, that the amount of blue in the halos produced is capable of wide variation. Possibly the same thing occurs in glaucoma. I think you will find that this blueness of the spectrum is most accentuated in the cases in which steaming of the cornea is most marked.

**THE METHOD OF OBSERVING AND MEASURING HALOS.**—When testing a patient in one's own dark room, there is no better method of eliciting the

presence of halos than that of asking him to look at a naked ophthalmoscope bulb. It will be found by experiment that a certain intensity of light is the most favorable for the purpose. Too bright a light causes a large corona, and so interferes with the spectrum colors, whilst too dull a light fails to call them into being. The iris diaphragm aperture of an electric or other light used for retinoscopy, or the light of an Edridge-Green lantern, is also serviceable. A candle flame is hard to beat. An ordinary naked electric globe is most unsuitable. For use away from one's own consulting room, a candle flame is always both available and effective. So also is the bulb of one's self lit ophthalmoscope.

Several of my patients test their eyes at frequent intervals, whenever they have occasion to strike a match, holding the flame at arm's length for the purpose. This habit has thrown a not unexpected light on a small point in the diagnosis of glaucoma. The majority of patients notice their halos only at night, and most easily in the winter time, when the lights are lit early. On the other hand, they are most troubled by mists in the early mornings. The explanation is not very difficult. The opportunities for testing the eye by lights occur with much greater frequency at nights, and especially on dark nights. On the other hand, the mists of vision are most easily appreciated by daylight, and at night are largely obscured, or at least rendered less easy to appreciate, by the darkness and by the difficulty in judging how deep that darkness is; for, as we all know, nights vary greatly. All the same, the mists and halos always go hand in hand, and this is quickly revealed to any patient who, on waking with misty vision, strikes a match as soon as he gets out of bed, and gazes at the flame.

In order to measure the angular diameter of a halo, we require to know (1) the distance of the rings from the eye, which is of course identical with the distance of the source of light from the eye, and (2) the diameter of the

circle. It seems most rational to measure to the outer or orange-red ring. Most observers measure from the center of the source of light to this ring and double the radius so obtained; this is considerably easier for the subject than measuring the total diameter, for in the latter case he has two points to think of instead of only one, the center of the source of light being fixed thruout. The method adopted by the writer has been to work in a dimly lit room at a distance of 10 ft. from a small bright source of light, and to use a long, narrow strip of paper, preferably mounted on cardboard. This is held vertically so that the lower end of it corresponds with the middle of the light and is close alongside of it. The hand holding a pencil is moved upward till the outer border of the desired ring is reached, and a mark is then made on the paper. The radius of the ring so marked out is doubled and gives the diameter of the halo. Knowing the distance from the eye to the observed source of light (X) and the measurement of the halo from edge to edge (Y), a simple formula enables us to calculate the

angle ( $\Theta$ ) required. viz.,  $\tan. \Theta = \frac{Y}{X}$ ; a

reference to a logarithm table completes the calculation, and gives us the measurement of the angle in degrees. To put the matter approximately for

those who desire to avoid all mathematical calculations. If the light is 10 ft. from the observing eye, the diameter of the halos will be as follows: For  $2^\circ$ ,  $4 \frac{1}{5}$  ins.; for  $3^\circ$ ,  $6 \frac{1}{4}$  ins.; for  $4^\circ$ ,  $8 \frac{1}{2}$  ins.; for  $5^\circ$ ,  $10 \frac{1}{2}$  ins.; for  $6^\circ$ ,  $12 \frac{1}{2}$  ins.; for  $7^\circ$ ,  $14 \frac{3}{4}$  ins.; for  $8^\circ$ , 17 ins.; for  $9^\circ$ , 19 ins.; for  $10^\circ$ , 21 ins.; for  $11^\circ$ ,  $23 \frac{1}{3}$  ins.; for  $12^\circ$ ,  $25 \frac{1}{3}$  ins.

Messrs. Emsley and Fincham used a more scientific method of measuring the diameters of observed halos. They say: "The size of the halo was measured in a manner similar to that used by Young in his eriometer. The source, 100 c. p. pointolite lamp, was placed immediately behind a metal plate, in which was a hole of 3 mm. in diameter; at the extremities of a diameter of a circle of 2 cm. radius described around this hole as a center were two further holes, each of 1 mm. diameter. By varying the distance of the eye from this plate, the two smaller holes could be made to coincide with any desired color ring of the halo which surrounded the central hole. The lamp was enclosed to prevent illumination of the surroundings. . . The observations were made in a dark room with nothing between the plate and the eye." I am having a lamp made on this principle for the easy and convenient measurement of halos in the course of one's clinical work.

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## OPHTHALMOSCOPY BY RED FREE LIGHT.

A. S. GREEN, M.D., AND L. D. GREEN, M.D.

SAN FRANCISCO, CALIFORNIA.

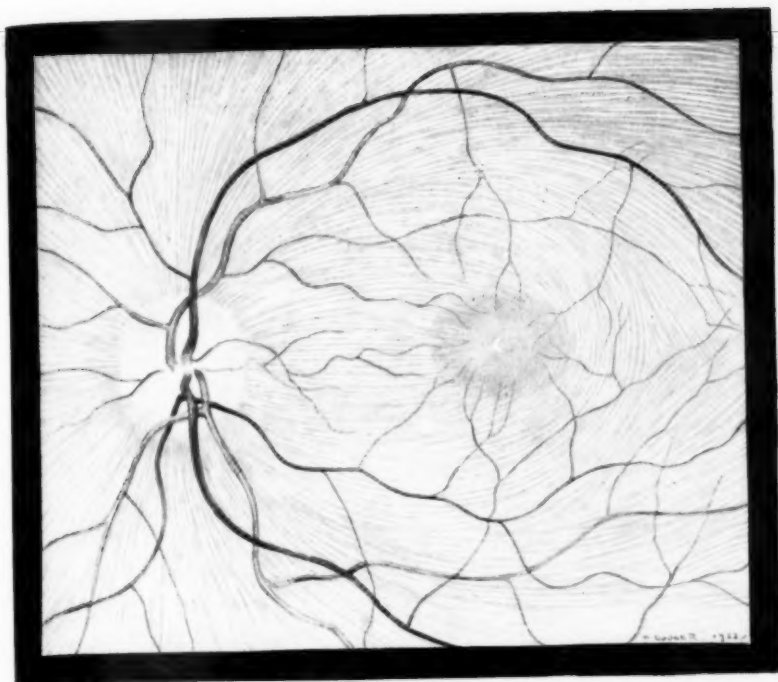
The color of the ocular fundus depends largely on the light used in ophthalmoscopy. The retina is transparent to red but less so to blue light. With the red filtered out, the choroid becomes less visible and the retina more visible. In this way pathologic changes in the retina are made much more evident. The appearances are shown in colored plate No. I. Read before the Pacific Coast Oto-Ophthalmic Society, Salt Lake City, September, 1922.

The color of the normal fundus, as seen with the ophthalmoscope, depends upon two principal factors: First, the kind and color of the luminous source employed; and second, upon the race and color of the individual. In ophthalmoscopy by ordinary light, whether produced by a kerosene lamp, gas or electricity, the fundus appears red, varying in degree from a slaty color in dark skinned races to bright red in blonds. The red color of the fundus is derived chiefly from the pigment epithelium of the choroid and slightly from the choroidal capillaries, the degree of its saturation determining the depth of red. The normal retina, however, is practically transparent to ordinary light. One sees mainly the choroid and the retinal vessels, and these not always distinctly, nor for their entire length, especially in the macular region.

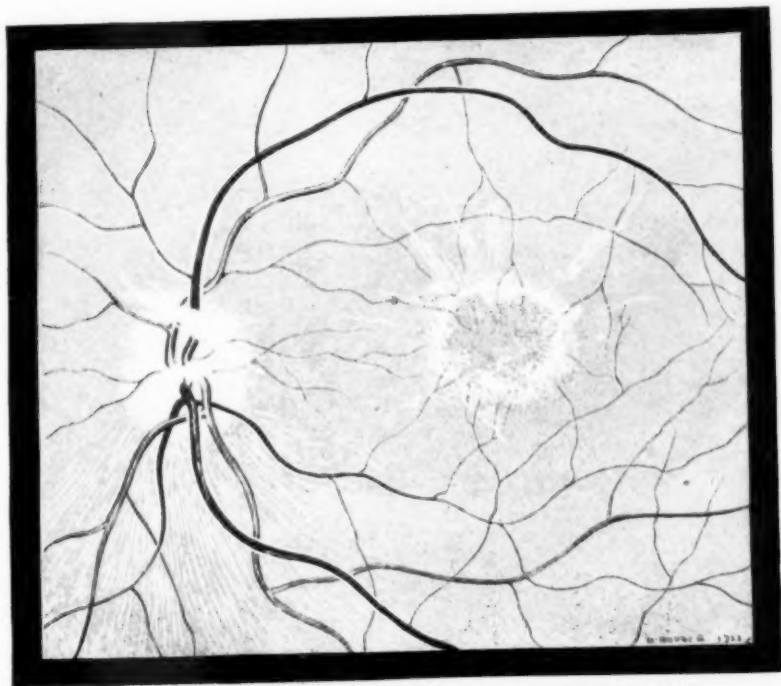
By contrast, when the red rays are excluded from the source of light, the retina becomes visible and the choroid relatively invisible, excepting in the case of pronounced blonds and albinos, when the choroidal vessels may be seen. The theory upon which this is based is as follows: The red rays of the spectrum are of long wave length and have great penetrating power. To these rays the retina is transparent. On the other hand, green and blue rays, being of short wave lengths, are but slightly penetrative and hence easily reflected. Consequently when these rays reach the retina, they do not pass it, as some are reflected and some absorbed, while others are altered by the retinal stroma. The retina, being opaque to these rays, becomes visible when the red rays are excluded. Vogt applied these principles in practice and published his first paper on ophthalmo-

scopy by red free light in 1913. The war was responsible for delaying a more general dissemination of this contribution to our diagnostic armamentarium, tho he published eight or ten papers from 1913 to 1919. While in no way displacing ordinary ophthalmoscopy, it is a most important aid in examinations of the fundus, just as ski-ascopy or ophthalmometry is an aid in refraction. The employment of red free light in ophthalmoscopy will become more general as its importance is realized, and as its practicability and ease of employment is increased.

Vogt uses an arc lamp of about 1500 candle power placed inside of an asbestos lined box. As a filter he used one glass receptacle containing an aqueous solution of 30% copper sulphat which eliminates the infrared rays, and a second glass receptacle containing a 1% solution of erioviridin which excludes the red and orange rays. This apparatus was bulky and the solutions had to be occasionally renewed. Recently the firm of Zeiss have introduced a glass screen, which does away with the inconvenience of solutions and thus far it is the best filter we have been able to find. The filters of Cantonnet and of the Eastman Kodak Company, as well as various forms of colored glass which we have collected at home and abroad, have not proved adequate. While in Basel last year, the writers had constructed a portable arc lamp, which can be placed on a movable bracket and thus more easily manipulated. But improvements are necessary and will undoubtedly follow. (Bausch & Lomb have just constructed a luminous ophthalmoscope with a filter which promises to overcome most of the objections of the large bulky instruments, but at the



1. NORMAL FUNDUS BY RED FREE LIGHT (AFTER KÖBY)



2 PATHOLOGIC APPEARANCES BY RED FREE LIGHT

A COMPOSITE PICTURE SHOWING MARBLEIZED APPEARANCE OF FUNDUS AND ABSENCE OF NERVE FIBERS EXCEPTING A FEW BELOW DISC; A BAND OF EXUDATE ACROSS THE DISC AND ALONG THE VEINS; THE DOUBLE CONTOUR FOLDS RADIATING FROM THE MACULA, AND THE MACULAR DEGENERATIONS.

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time of writing they were not yet on the market.)

The technic is somewhat more difficult than in ordinary ophthalmoscopy. The beam of light must fall partly on the temple and nose of the patient and partly on the mirror. It must, therefore, come from behind the patient and be directed obliquely. The examiner should be seated in front of the patient so that the mirror is in the center of the beam of light. Very little latitude of movement is permissible either on the part of the patient or observer, to avoid getting outside the center of the beam. The method is suitable for examining the finer details of the retina rather than for the exploration of a large field, therefore, the direct method only is used, necessitating a widely dilated pupil, preferably under homatropin. The light even tho filtered is so intense, that it is permissible to view the fundus only a few seconds at a time. For this reason it is well for the beginner to first start with a case of optic atrophy, or any other blind eye in which the retina is easily visible, in order to learn the technic and study the details of the backgrounds.

The normal fundus under red free light presents a yellowish green tone and numerous retinal reflexes are seen to move about with the movement of the mirror. The disk appears white, the vessels almost black, very clear cut and can be followed up to their finest ramifications. The choroid is not visible. The macula can always be easily found as it stands out as a lemon yellow area on a green background. The macular reflex is always seen. Its absence denotes a pathologic condition. The retinal vessels may be seen to extend to the foveola.

One of the most important features in ophthalmoscopy by red free light is the visibility of the retinal fibers. It is very interesting to observe the distribution of the nerve fibers, especially in adolescents. These fibers radiate from the papilla in all directions. They are nearly parallel from the papilla to the yellow spot; above and below they converge toward the macula, finally meet-

ing in a sort of raphe on the temporal side of the macula where they are gradually lost. Their partial or complete absence is of great diagnostic importance.

#### PATHOLOGIC APPEARANCES.

*The Media:* In examining the media the observer should be seated so that the mirror is at a distance of about thirteen inches from the observed eye. With a three or four D plus lens in the ophthalmoscope, one will be able to notice fine deposits on Descemet's membrane, particles in the aqueous, fine opacities in the lens and dust opacities in the vitreous. They stand out black against a yellowish green background. The condition of the retina which the beginner will most easily recognize is that of early atheroma. Due to the clearness with which the vessels stand out, one can see the slightest depression of the veins where crossed by the arteries, which would escape the detection by ordinary ophthalmoscopy. The same is true of periphlebitis, where the exudate may be seen along the vein. On the other hand, what may appear as a small retinal hemorrhage may be found to be nothing but varices or a collection of newformed vessels. Retinal hemorrhages appear very plainly and early, so that frequently it is possible to detect a beginning choked disc on account of the minute hemorrhages at the disc margin or on it, before any other evidences appear. While retinal pigmentation is quite easily recognized, choroidal degeneration frequently escapes detection; so that it is often possible to differentiate between an affection of the choroid and retina. Changes in the retina are generally better seen by red free light than by ordinary light. The converse holds true as regards the choroid; thus retinal pigment is very distinct while choroidal pigment may be very indistinct or invisible.

In some so-called functional disturbances, as in hysteria or in suspected simulation, it may help in making a diagnosis; as frequently real pathology will be discovered in these conditions with red free light. Thus it assumes

importance in medicolegal work; also in amblyopia ex anopsia and strabismus retinal changes will sometimes be discovered to account for the deviation or lack of vision.

Ophthalmoscopy by red free light probably assumes its greatest importance in diseases of the *optic nerve* and its retinal fibers. As we know, it is frequently impossible to decide from the appearance of the disk whether it is a case of primary or secondary optic atrophy. With red free light, however, we can see the slightest amount of exudate on the disc or its border, or along the vessels, which would be invisible by ordinary ophthalmoscopy.

In tabetic optic atrophy some of the nerve fibers become indistinct or disappear, while the yellow spot becomes enlarged long before any changes can be detected by ordinary light.

In disseminated sclerosis, patches of fibers will be missing, while in retrobulbar atrophy the papillomacular bundle is absent, the remaining fibers being undisturbed. In optic atrophy from any cause, the nerve fibers become indistinct or disappear entirely, depending upon the degree of atrophy. The retina then assumes the mottled or marbled appearance wholly or in part.

In acute inflammatory conditions

the fibers become distinct and prominent, but as the condition becomes chronic they gradually fade and disappear. The double contour reflexes, described by Vogt, appear in such conditions as acute retinitis, optic neuritis, retinitis pigmentosa, and in the acute inflammations of the anterior segment, such as herpetic keratitis, episcleritis and iridocyclitis. They may also be seen in detachment of the retina, retrobulbar abscess and contusions of the globe. They appear as rosette shaped folds of the limitans interna which radiate from the macula, and are most easily seen before the age of forty.

In many of the above affections one may also occasionally find a honey-combed arrangement of vesicles in the macula, which Fuchs has also found microscopically.

#### CONCLUSIONS.

The literature published by Vogt and his pupils is quite extensive, and even a summary of it would consume more space than is permissible in a paper of this kind. The object of this contribution is to call attention to some practical points in order to arouse interest in a method of examination that has great possibilities, altho it is not expected to displace ordinary ophthalmoscopy.

## FORMALIZED CARTILAGE IMPLANTS FOLLOWING ENUCLEATION.

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For implantation following enucleation, grafts of dead or formalized tissue seem likely to supercede other materials. The value of such implants is here stated, with the method of preparing and implanting them.

The removal of an eye in the great majority of cases, where an implantation has not been attempted, generally leaves depressions, unnatural folds in the upper or lower lid, ptosis, impaired motility, and sinking of the artificial eye. Most ophthalmologists

writer's opinion, they do not entirely answer the purpose. For those who are not satisfied, I wish to emphasize the work of Magitot in the use of formalized beef cartilage implants.



Fig. 1. Cartilage graft has been expelled from instrument and inserted into Tenon's capsule.

of the present day generally concede that something should be put into the socket following enucleation, but just what seems to serve this purpose best is still a much debated question.

For the above reasons, aluminum, celluloid, sponge, wool, silver, rubber, silk, catgut, peat, agar agar, paraffin, asbestos, and other substances have been proposed, and have met with varying successes, until at the present time the most common implants are gold balls, glass balls and fat. Each of these substances has its champion, but it is not the purpose of this paper to dwell upon their advantages and disadvantages, except to state, in the



Fig. 2. Cartilage implant in Tenon's capsule.



Fig. 3. Suture is attached to closed capsule of Tenon, while forceps are holding muscles and conjunctiva away.

During the war, being connected with Blake's Hospital in Paris, the opportunity was afforded me of seeing a number of animal cartilage grafts used in reforming the rim of the orbit, and in the orbit itself. The tissues tolerated the animal cartilage very well, there being very little inflammatory reaction. Some of these cases were a year old, and the results were so uniformly good, that I decided to try cartilage at the first opportunity. The following procedure has been most successful in my hands:

The cartilage (generally costal) can be obtained from any slaughter house,

normal salt solution for one week, and then kept in sterile water. A cartilage graft prepared in this manner can be preserved indefinitely.

In the introduction of foreign material into the orbit following enucleation, two points should be emphasized: 1st, Tenon's capsule is a definite structure; and, 2nd, all implants, no matter of what material, should be placed in it. The procedure is as follows:



Fig. 4. Tenon's capsule, muscles and conjunctiva closed over implant, making good stump for artificial eye.

and it is well to get as large a graft as possible, because after being chiseled and cut into shape, the implant will be considerably smaller, and a snug fit into Tenon's capsule is always desirable. The cartilage should be cut into spheres of various sizes ranging from 16 to 22 mm. in diameter. Two hemispheres of cartilage can be implanted if a graft of sufficient size can not obtain. It has been my custom to chisel off the anterior surface of the cartilage sphere, and make it slightly flat with the hope in this way of obtaining better motility. The implants are then placed in a 2% solution of formalin and left there for 2 weeks, after which they are washed on successive days in sterile



Fig. 5. Side view, one year after operation, showing no sinking of upper lid, lower lid or artificial eye. Case shown before Clinical Research Society, New York City.

After the usual preliminary operative technic has been carried out, the dissection of the conjunctiva should begin above, and one's first endeavor is always to hug the eyeball and not dissect the conjunctiva free of the muscles. The conjunctiva is dissected around the sclera to the attachments of the recti and oblique muscles, which are cut free. The muscle hook is not necessary and should not be used. The point to be kept continually in mind is to hug the sclera all the time and if the dissection is carried out in this manner, Tenon's capsule will be preserved and the graft can be enclosed in it. The eyeball is prolapsed; the nerve cut, and its removal is accom-

plished in the ordinary manner. The edge of Tenon's capsule is grasped with fixation forceps in three places, and any of the instruments made for the introduction of spheres into the cavity is used to implant our cartilage, with the flat surface anteriorly. Tenon's capsule is now well closed with the

daily, cleansed with boric acid solution, and a pressure bandage applied.

Some have suggested the use of cold compresses following implantation, but there has been so little reaction with the use of cartilage that I think this unnecessary. The advantages of foreign cartilage are: First, cheap and

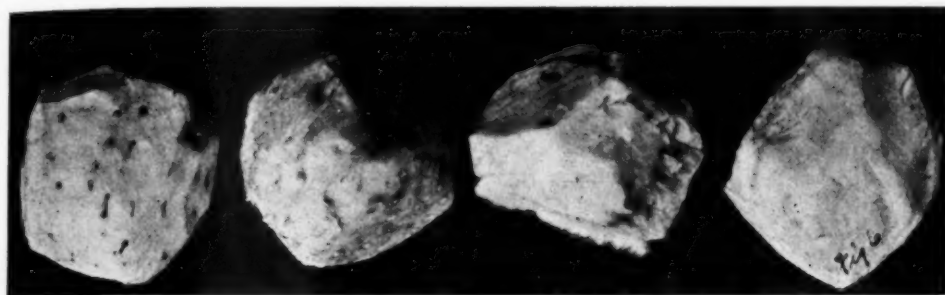


Fig. 6. Cartilage implants before shaping.

smallest catgut and interrupted sutures in a vertical direction. The mass of muscles attached to the conjunctiva are also sutured together with a fine catgut suture; that is, the internal rectus and external rectus are sutured together and then the superior and inferior. The conjunctiva is closed with interrupted black silk sutures in a horizontal direction, and a good snug pressure bandage is kept on for five days. The eye should be dressed

easily attainable; second, can be made in any size and shape; third, keeps indefinitely in sterile salt solution; fourth, well tolerated by the orbital tissues.

I have suggested to a number of rhinologists and otologists that similar grafts could be used to fill in the depressions caused by radical frontal and mastoid operations, and am sure that after a fair trial, they will be as enthusiastic as I am.

## ACTION OF MIOTIC DRUGS ON DISEASED INTRAOCULAR STRUCTURES

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Miotics are used for glaucoma so that it is difficult to discriminate between the effects of the drug and those of the disease. The effects in question are here discussed with reports of two cases illustrating the action of the drugs. Read before the Colorado Congress of Ophthalmology and Oto-Laryngology, July, 1922.

Recorded observations of the effects of miotics have been made mostly in connection with their use in the treatment of glaucoma. The apparently accepted conclusions are that they produce contraction of the sphincter iridis and of the ciliary muscle, and reduction of the intraocular tension; that the tension reducing effect is due to the miosis produced by the action of the sphincter, and that reduction of tension does not occur if the sphincter is not complete. The use of miotics, however, is usually advised in cases of glaucoma in which the tension has not been adequately reduced by iridectomy. It is recognized, or perhaps only hoped, that the miotics still have effect on the tension, even when the sphincter is not complete.

I have reported<sup>1</sup> measurements of the size of pupils and colobomas, and tonometric measurements of the tension, in eyes which had been operated by iridectomy for glaucoma, together with the alterations produced by the use of eserine. These measurements show that eserine can produce, in such eyes, contraction of the remaining portion of the normal pupil, and narrowing of the coloboma, and reduction of glaucomatous tension in about the same degree as when the sphincter is complete. It is, therefore, probable that miotics have effect on other portions of the iris than the sphincter, and that their tension reducing effect may be due as much to the effect on the ciliary body as to the effect on the iris. Koller<sup>2</sup> in a recent paper considers the action of miotics and mydriatics on the blood vessels of the iris, and thinks that their miotic and mydriatic effects are due in large part to the power of miotics to dilate, and of mydriatics to constrict the vessels. The reasons given in support of this opinion were

not accepted by those who discussed the paper; Verhoeff especially expressing the exactly opposite opinion, viz., that miotics constrict the iris vessels, and that mydriatics dilate them. That these drugs have some effect on the vessels of the iris is probable. What the effect is remains to be determined.

Long continued induced vasoconstriction or vasodilatation might well bring about organic changes in the healthy iris; even more probable is it that they might cause additional pathologic conditions in the iris already diseased. In cases of marked glaucoma, pathologic changes are usual in the iris and ciliary body, perhaps also in the choroid. Conspicuous is atrophy of the iris, attributed to the increased intraocular tension. According to Fuchs<sup>3</sup>, atrophy of the iris may occur in consequence of increase of tension, the main agent being the compression of the bloodvessels at the root of the iris. That incipient changes may exist in the apparently healthy iris is suggested by the difficulty sometimes encountered at operation.

Woods<sup>4</sup> reports three cases of friability of the iris found at operation. In all three cases the iris appeared normal before operation, with none of the characteristics of atrophy. In each case the iris was so friable that a good iridectomy was impossible. In one case, the fellow eye had been operated a short time before with no complication. In one case the operation was followed by recurring hemorrhages into the anterior chamber. All of these eyes were glaucomatous, and all had been under treatment with miotics for some time before the operating.

Secondary iridocyclitis is a usual concomitant of acute glaucoma, and sometimes the iridocyclitis may be

come the predominating factor. That it can remain entirely secondary to the glaucoma is shown in those cases of acute glaucoma which are quickly relieved by the vigorous use of eserine. That it may persist independently of the primary disease, and be aggravated by a miotic treatment, may be reason for the failure of benefit from miotic treatment in many cases of acute glaucoma, and for the increase of the glaucoma symptoms sometimes caused by eserine.

On the other hand, increase of intra-ocular tension is a usual or frequent concomitant of acute iridocyclitis, and may be of considerable degree. It is even probable that some cases of acute glaucoma are primarily iridocyclitis, with secondary increase of tension of such degree as to become the predominating symptom and the immediate dangerous factor. These would be the cases of primary acute glaucoma without cupping of the optic disc, and the cases showing the most favorable results from iridectomy, and especially the most permanent results. Their subsequent history is very different from that of the cases of acute glaucoma occurring in eyes with previous chronic glaucoma. The differential diagnosis between acute glaucoma and acute iridocyclitis is sometimes not easy.

Treatment of acute glaucoma with miotics relieves the uveal inflammation as well as the high tension, while mydriatics aggravate both; conversely, mydriatics relieve both the uveal inflammation and the high tension in iritis, while both are aggravated by miotics. A more thorough knowledge of the effects of miotics and mydriatics on the vessels of the iris and ciliary body would explain some of these occurrences, and be of value in our treatment of the mixed and doubtful cases.

There are clinical observations to show that miotics can cause hemorrhages in the diseased iris; that miotics long continued, can cause plastic iritis in the apparently healthy iris; and that hemorrhage can be caused in the diseased retina by the reduction

of tension brought about by miotic treatment.

Hemorrhage from the iris is frequently caused by eserine in cases in which extensive changes have occurred in the iris from violent or long continued inflammation. The hemorrhage may be from newformed vessels, which are said by Fuchs (*loc. cit.*) to "have quite often a course that does not in any way correspond with the regular radial arrangement of the normal vessels of the iris—vessels of this sort do not lie in the iris itself, but in a thin exudation membrane deposited upon it."

Traction of the iris on such newformed and illformed vessels, having a course not corresponding with the iris fibers, might be sufficient to produce hemorrhage by mechanical rupture of the vessels. In most of these cases, however, the iris is so rigid from thickening and adhesion to lens or pupillary membrane, and its excursion of action so limited, that such mechanical effect is not probable. Furthermore, the hemorrhage occurs in cases in which there is no apparent exudation membrane, and no apparent newformed vessels. Reduction of intra-ocular tension is not produced by miotics in these cases, and consequently cannot be a factor in causing the hemorrhage. In similar cases of diseased iris, hemorrhage is sometimes produced by mydriatic treatment as well as by miotic treatment. In both miotic and mydriatic treatment, traction on the iris may occur, and in both, vasoconstriction or vasodilatation may occur, and to a sufficient degree to cause hemorrhage from normally formed vessels which are in a diseased condition.

Plastic iritis has been observed to occur after long continued use of miotics in eyes with apparently normal irides. Since these are cases of chronic glaucoma, usually of long duration, it is not certain that the irides are really normal.

In the following case, however, there is reason to think that the irides were free of any abnormal condition or influence other than that of miotic treatment:

CASE 1. The patient, a woman of 65 years, had been in the care of a competent oculist for glaucoma, beginning five years before my first observation. For a year or more he had managed treatment himself, seeing the patient frequently. At a time when the frequent visits were impossible, a prescription for eserine solution was given, with the admonition never to be without it. During the three years before coming under my observation, she had no medical advice. Use of the eserine had been continued by the patient up to a year before this examination, and resumed again after an interval of six months, when she noticed recurrence of the "tension" and blurring of vision. During the past few months the vision had become worse. The eserine had been used most of this time.

The pupils were very small, preventing ophthalmoscopic examination. The anterior chambers were shallow. Tension measured with the Schiötz tonometer, under holocain, was normal, and the same in the two eyes, 25 mm., falling to 22 mm. after one minute of continuous contact.

There was some aching of the eyes, but little or no hyperemia. Cocaine solution was instilled, with only slight effect on the pupils, but showing them to be irregular. During the next few days cocaine was used cautiously, finally with moderate effect, revealing posterior synechiae in both eyes; in the right eye a broad adhesion at the lower, inner border of the pupil; in the left eye an adhesion at each lateral border. Other portions of the pupils were free, but there were fine pigment specks on the anterior surface of each lens, outlining a small pupil.

Ophthalmoscopic examination was now easy, and showed nothing abnormal, the discs showing no depression. The blurring of vision disappeared, and with correcting glasses the vision was normal, 20/20, in each eye. There was hyperopia of 2.75. The fields for white were normal.

She has been under periodical observation, now for nearly a year, and there have been no subjective or objec-

tive symptoms of active disease. After the first few days of treatment with cocaine, there has been no active treatment. This appears to be a case of glaucoma cured at the expense of some posterior synechiae.

Intraocular hemorrhages frequently result from the sudden decrease of intraocular pressure brought about by perforating injuries, or by perforating operation wounds, such as those for cataract or glaucoma. The decrease of pressure brought about by the use of miotics might also be the exciting cause of hemorrhage if the vessels were already weakened by disease.

The course of events in the following case were strongly suggestive of the influence of eserine in this way:

CASE 2. The patient, a man of 59 years, was seen first in 1915. Two weeks before, after a period of excessive near work, the vision of the right eye became blurred suddenly, so that he was unable to read any but very large print. The family physician found the blood pressure to be 175, and in several tests of the urine, a trace of sugar was found once. The disturbance of vision was attributed to incipient diabetes, and appropriate treatment given, and a slight improvement in vision followed. There was no pain and no inflammatory symptom.

The left eye had been blind about three years, the loss of vision first appearing as a blur like a pencil point in the upper, outer field. Soon the central vision became blurred, and has gradually diminished to its present condition, with no pain or symptom of inflammation. The family physician attributed the loss of vision to excessive use of tobacco. There was no treatment. The external appearances were normal.

Vision of the right eye 20/40, emmetropic, with the field for white normal. Vision of the left eye eccentric recognition of direction of motion of hand at 1 foot.

Ophthalmoscopic examination showed glaucomatous cupping of the disc, with a little edema of the retina and disc borders in the right eye. The left eye showed the usual appearance of old

simple glaucoma, all details perfectly clear, the disc sharply and deeply cupped, and with the color atrophy. The transparent media were clear in both eyes. Measurements with the Schiötz tonometer were: Right eye, 39 mm. Hg. falling to 31 after one minute of continuous contact, with the 7.5 gram weight. Left eye, 65 mm. Hg. falling to 60 after one minute, with the 10 gram weight.

No reading was shown on the tonometer scale with lighter weights. There was marked oscillation of the tonometer pointer, 1 to 2 mm., synchronous with the pulse. The pupils were moderate in size.

During the following ten days' miotic treatment, eserine, was given, the pupils responding normally to the miotic influence. Then, with marked miosis, the tonometer measurements were: Right eye, 33 mm. falling to 28 after one minute, with the 7.5 gram weight. Left eye, 60 mm. falling to 52, with the 10 gram weight. As in the first trial, no readings were obtainable with the lighter weights of the tonometer. After another five days of treatment, he went home. A solution of eserine sulphate, 1/240 was prescribed, to be dropped in both eyes night and morning.

Vision of the right eye was now 20/30, with a subjective sense of greater clearness. Vision of the left eye was unchanged.

After two weeks at home, the vision became much worse, following several days of slight blurring. There were numerous small hemorrhages in the retina around the disc and in the region of the macula; the pupil small and the media clear; no pain and no inflammatory symptoms. The left eye was unchanged.

Measurements with the tonometer were: Right eye, 28 mm., falling to 25 after one minute, with the 5.5 gram

weight. Left eye, 65 mm., falling to 60, with the 10 gram weight.

It is to be noted that the measurements 28-25 with the 5.5 gram weight, compared with 33-28 and 39-31 with the 7.5 gram weight, indicate a greater reduction of tension than the numbers indicate. Readings with weights other than those noted were in parts of the scale said to be less accurate; the higher weights always measuring the tension as lower than shown by the weights used.

General examination was negative. The urine was normal, blood pressure 160, Wassermann test of the blood negative. The internist's diagnosis was general arteriosclerosis. During the period covered by this report, frequent urinalyses were made, at no time showing any trace of sugar or other abnormality. Since the first diagnosis of incipient diabetes by the family physician, the patient had been on a strict antidiabetic diet, and had lost twenty-five pounds in weight.

A solution of pilocarpine muriate, 1/240, was prescribed, to be used night and morning; the eserine was discontinued. A slight improvement followed, but after seven weeks there was a sudden onset of severe pain, with congestion and great increase of tension of the right eye.

The eye then went the way of malignant hemorrhagic glaucoma. Sclerocorneal trephining with iridectomy was done for relief of pain, and in time the eye became quiet. Several months later, the other eye went thru an attack of acute glaucoma, during which cataract developed. The lens of the right eye remained clear.

These cases are nothing more than suggestive, but sufficient for the conclusion that miotic treatment is capable of some unexpected effects, and eyes under miotic treatment should be under close observation.

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## AN ACCOMMODATION RULE WITH NEW FEATURES.

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The rule here described is prepared for testing visual acuity, near points of accommodation and of convergence, heterophoria, central color vision, the blind spot, and with a protractor, to determine the meridian of cylinder axis.

The difficulty or impossibility of securing the Prince rule and the necessity for carrying a millimeter scale when

in that: (1) the string is attached from one extremity of the rule instead of from the center, thus permitting the addition of a millimeter scale which may be used separately or in conjunc-



Fig. 1. Front view of Beren's accommodation rule.

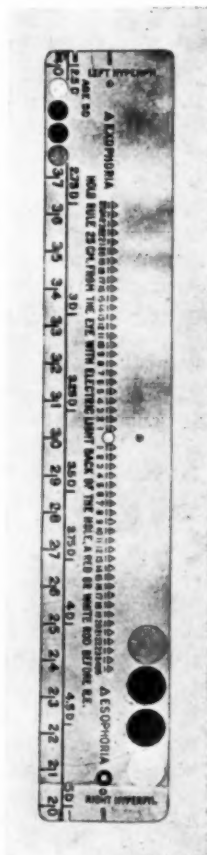


Fig. 2. Back view of Beren's accommodation rule.

the Maddox rule is used, suggested the usefulness of a combination rule.

The rule is a modification of the one devised by Prince and modified by Maddox. It resembles the Prince rule in two particulars, namely, that it may be used for testing the near point of accommodation and has a millimeter scale. It differs from the Maddox rule

tion with the dioptric scale. (2) The near muscle test is arranged for use at 25 cm., instead of 33 cm., and the reading is in prism diopters, instead of degrees. (3) A stenopaic hole has been added for rapidly determining the possibility of improving vision. (4) A wide, stiff leather case for use as a screen. (5) A small dot with a line

thru it has been placed at the upper extremity of the rule, so that the eye may be watched as the near point of convergence is taken. (6) A protractor for determining the axis of cylinders has been added. (7) Large and small colored test objects are supplied which are useful in testing central and peripheral color vision.

#### DIRECTIONS FOR USING THE RULE:

**Testing visual acuity:** Snellen test type, numbers, the broken ring and star are available for testing visual acuity. If the 6 M., the star or the opening in the largest ring can be seen at six meters, the vision is 6/6. If the type can not be seen at this distance, the letters are brought nearer the patient, until they can be seen. This distance in meters is the numerator and the type seen is the denominator. For instance, if the six meter type can not be seen until it is within four meters of the patient's eyes, the vision is 4/6. The rule and case were made so that they might be used for covering the eye not under examination. A stenopaic hole, 1 mm. in diameter, is placed at one end of the rule, for estimating the approximate maximum visual acuity of a patient's eye with or without lenses.

A millimeter scale, which is to be found on the Prince rule but not on the Maddox rule, has been added and is of value in taking interpupillary distance. (a) The rule is inverted over the patient's nose, the patient fixing the observer's right pupil with his left eye and the observer closing his left eye and covering the patient's right eye with his right hand, holding the rule with the left hand. The zero point on the millimeter scale is placed at the temporal margin of the left cornea. Then the observer covers the patient's left eye with his right hand and the patient's right eye fixes the observer's left pupil. Reading is made at the nasal border of the right cornea. This measures the interpupillary distance for infinity, i. e., the distance usually used by the optician in fitting distance lenses. (b) For determining the interpupillary distance for reading at 13 inches, the observer stands 26 inches

from the patient, the patient is asked to fix the observer's left eye with his left and with the zero point on the millimeter scale placed at the temporal margin of the left cornea, the patient is directed to fix the observer's right eye with his right, and the reading is made at the nasal border of the right cornea. This is the interpupillary distance for prescribing near lenses.

In testing the *near point of accommodation*, the findings are recorded in diopters or millimeters, from the lens set 14 mm. in front of the patient's cornea. The distance is measured by means of the string. On the front of the rule the readings are in diopters and millimeters, and if the distance at which the print blurs is 2.75 diopters, the cord is wrapped around the rule and read on the back.

The *near point of convergence* is measured by means of the black dot with a vertical line thru it. The upper portion of the rule, containing the test object spoken of, is brought toward the patient's eyes in the midline on a level with them, until the test object begins to double or the patient's eye is seen to cease fixating.

To *determine the convergence angle* the interpupillary distance must be known, and twelve is added to the near point of convergence to make it coincide with the intercentral base line; then the following formula may be used:

$$\frac{50 \times Pd}{Pc + 12} + 3 = C$$

The convergence angle in adults is 35 to 55, and in children 60 to 63.

**Test for heterophoria:** The rule may be used for rapidly determining the near deviation in prism diopters. It is held at 25 cm. from the eye, distance being conveniently measured and held constant by means of the knot placed at 25 cm. An electric light is held back of the hole and a red or white Maddox rod before the right eye. The position that the rod takes with relation to the prism diopter marks on either side of the hole, when the rule is held horizontally, measures the esophoria or exophoria in prism diopters. When the rule is held vertically and

the red rod is held so that the line is horizontal, the position where the rod meets the prism diopter scale measures the amount of the right or left hyperphoria.

*Central color vision* may be roughly tested by rapidly covering and uncovering the small colored test objects and asking the patient to name them, testing each eye separately.

The ten millimeter colored test object may be used for the confrontation test for form and colors, either eye being tested separately. The patient's right eye fixes the observer's left eye and the eye not under examination is covered or closed. The test objects are brought into the field of vision equidistant from the patient and observer, and as the colors are the same on both sides, the patients' fields can be compared with the observer's. The five millimeters test object may be used on a Schweigger or any other perimeter.

*Blind spot of Mariotte:* The confrontation test as usually described and practiced has proven unreliable, at least in my hands, due to the examiner's inability to maintain a fixed distance with the test object. However, with the aid of the modified Maddox rule, or with an ordinary string one meter in length, the test may be made with accuracy. The end of the meter string is held by the patient on a level with the right eye, the observer holds the other end on a level with his left eye. The eye not under examination is closed or covered and a white headed pin tied into or passed thru the string at 50 cm. is carried temporarily below the horizontal, eye fixing eye, until the blind area is found and compared with the observer's.

This method is rapid but accurate, for it controls distance and fixation, and with a little practice will be found an easy clinical test.

*Use of the Protractor:* This is used for the determination of the axis of an astigmatic lens. A vertical black line, 1 mm. in diameter, is observed thru the lens, and a line marked thru the lens by means of a glass marking pencil or India ink at the point where the line breaks with the rotation of the lens, when using minus cylinders, and against, if plus cylinders are used. The base line for the lens is drawn by connecting the small dots or lines made in the lens by the optician or, in the case of spectacles, along the line which joins the bow and nose piece. The lens is placed outer surface downward on the protractor, and the horizontal mark is placed thru zero and 180°, and the point where the outer marks meet the scale is read off in degrees as the axis of the cylinder.

The string of the rule is one meter in length, and as this is the common distance for retinoscopy, it will be found useful to have the patient hold the rule by the eye under examination, and have the observer hold the other end of the meter string along the retinoscope. The meter length will also be found useful in measuring the distance of the eye to the point of fixation in mapping the blind spots at 1 meter or 75 cm., for there is a knot at 75 cm. The knot is also of value in using a fixed distance in mapping diplopia fields.

(Manufactured exclusively for and sold by Halpert and Fryxell, Inc., 311 Madison Avenue, New York City, who are prepared to furnish the rule with more complete directions.)

## ETIOLOGY OF SYMPATHETIC OPHTHALMIA.

H. H. STARK, M.D.

EL PASO, TEXAS.

This is a preliminary report upon investigation of the relation of tuberculous infection to sympathetic ophthalmia. The great similarity of lesions in sympathetic ophthalmia and tuberculosis, and the power of tubercle bacillus to remain dormant in the body over long periods seem to point to tuberculosis as the possible cause. Read before the Colorado Congress of Ophthalmology and Oto-Laryngology, July, 1922.

When we consider all that has been written on sympathetic ophthalmia since the subject was brought permanently to the attention of the medical profession by MacKenzie one hundred years ago, when we consider the theories advanced and the experiments made to determine its etiology, it is doubtful whether anything now can be said which has not at least been previously suggested. However, it seems wise to occasionally make a review of the known facts and by "deductive scientific thinking," as suggested by Woodyatt<sup>1</sup>, build up a new picture in accordance with our present knowledge, to be proven true if possible, by laboratory experiments.

If we stop to analyze the theories as to the etiology of this disease, we find they fall into groups corresponding to the different periods of development in medical science, many not being in harmony with current teaching. The most recent is the idea of anaphylaxis, advanced by Elschnig<sup>2</sup>. His work seems to have been confirmed by Woods<sup>3</sup> in the latter's extensive experiments. However, other investigators disagree with Elschnig's conclusions, principally on the ground of their doubt as to the possibility of the development of an autoanaphylaxis. It seems rational to believe that pigment of the uveal tract is the main factor in developing the antigen, as it is only in the eye that this tissue is found in abundance. Recently, however, Kodama<sup>4</sup> has shown that any tissue of the eye may produce more than one antigen, some of them common to all tissues of the eye, others specific to the special tissue, concluding from his experiments that the pigment is not the only factor to be considered in sympathetic ophthalmia.

Dealing with the subject clinically, I think the most rational theory is that the antigen is developed thru the en-

dogenous infection of the uveal tract by microorganism, which may remain apparently in the human host for many years. There are a number of these organisms, but the two known to cause clinical conditions similar to sympathetic ophthalmia are tubercle bacillus and spirocheta pallida, both of which show, at times, decided affinity for all the tissues of the eye. Since the perfection of the complement fixation test, it has been conclusively proven that syphilis is not a primary factor. The tubercle bacillus produces a condition so similar to sympathetic ophthalmia, that I feel we must prove it is not the cause before proceeding along any other line of investigation.

The process as I see it may take place as follows: A primary injury to the eye by trauma or possibly an intra-ocular tumor, followed by secondary invasion by tubercle bacilli with their eventual destruction in the tissues, the development of an antigen taken up by the blood stream, with the sensitization and development of an allergy of the uvea of the secondary eye, possible disturbance of the relations existing between the complement and antibodies by an antigen from a general or focal infection. The result of the whole process is an anaphylactic reaction (if one so cares to call it) of the uveal tract of the secondary eye, producing the clinical picture recognized as sympathetic ophthalmia.

This theory has so appealed to me, that I have repeatedly applied it to my own cases as well as to those reported in the literature, and find that it harmonizes in every particular not only with tuberculosis, general and local, but with sympathetic ophthalmia as well.

I will briefly take up the main points in the cases considered:

First; about two-thirds of the cases of sympathetic ophthalmia develop

early in life, at an age when the individual has no immunity, or is developing his immunity for tuberculosis, at which time the tissues have less resistance to this infection than in the later period of life. This corresponds with the original observation of MacKenzie that the cases are more frequent in scrofulous children. The majority of cases occur within a few weeks after the injury, but may occur many years later, indicating that infection may be present at the time of the injury, only to invade the primary eye many years later. This corresponds to our present day knowledge of general tuberculosis, which we are now convinced may remain latent in small foci in the body for many years. If the immunity becomes lowered, the bacilli may be distributed by the circulation and attack weakened or diseased tissue. In considering the frequency with which these bacilli are found in the circulation, I would like to call attention to a recent article by Albertario<sup>5</sup>. He examined one hundred cases, most of them active tuberculosis with fever, but some with slight infection not connected with the lungs, and found bacilli fifty-two times in the blood stream. Naturally, in the apparently healthy individual the percentage would be much smaller, but even tho small, it would be in keeping with the percentage of injured eyes that cause sympathetic ophthalmia. It would also account for the small percentage of cases occurring from injury of the eye during the world war, as never in history has so thoro an investigation been made to eliminate the presence of tuberculosis before the individual was accepted as a soldier.

Second: The clinical picture generally accepted of sympathetic ophthalmia is that of choroiditis, papillitis, plastic iridocyclitis, nodules in the iris—all of which are common to ocular tuberculosis. Especially is plastic iritis similar to the condition found after administering excessive diagnostic doses of tuberculin. Clinically, even sympathetic irritation corresponds to our eczematous keratoconjunctivitis.

Third: Fuchs and his followers believe that the pathologic picture represented by sympathetic ophthalmia is a typical one. However, there must

be a very close resemblance to tuberculosis, as the ordinary pathologist is frequently unable to differentiate between the two.

Fourth: We find that Gifford's<sup>6</sup> method of using the salicylates corresponds with the treatment of scleritis, which to-day many believe to be due in the majority of cases to tuberculosis. It is quite possible that the salicylates have no direct action on the tuberculous infection, but neutralize in some manner the other antigens that have either lowered the resistance of the tissues or used up an excess of the complement.

We find in the literature an occasional mention of the successful treatment with tuberculin of cases diagnosed as sympathetic ophthalmia, such as Norman's<sup>7</sup>.

With these conclusions in my mind, I have had under way for some time a series of investigations, by which I hope to either prove or disprove that sympathetic ophthalmia is due to tuberculosis. I have attempted to produce an antigen by the growth of tubercle bacilli in a media containing the uveal tract. These experiments in the last year have not been entirely successful, but are being continued with modifications of the original method. Since the reading of Finnoff's<sup>8</sup> article, I have at the present time under way an effort to develop this antigen in the living eye, which I hope will be successful. My experiments are being conducted as follows:

Injection of the antigen into an animal endeavoring to develop a sensitization, which may be determined both clinically and by complement fixation.

Injection of some common type of bacteria to determine the effect on the previously sensitized animal, testing the human, both those who have had sympathetic ophthalmia and those with old injured eyes, as to their sensitiveness both to the new antigen and tuberculin. The result of these experiments will not be ready for reporting for several months.

Working along this line, I have handled one case, which I will briefly report.

Mrs. C. K. W., age 57, came under my care in April, 1918; general appear-

ance stout; no history of special illness for many years; urinalysis, trace of albumin with a few pus cells; teeth negative; deafness in left ear for twenty years.

History of the eyes: She developed trouble in the left eye twenty years before, which was diagnosed as glaucoma, for which she had been operated upon twelve years previously, with complete loss of sight immediately afterwards. The right eye began to trouble her in an uncertain way five years ago, but it was only in the last two years that she had noticed any loss of sight. Seven months previously, there was an operation on this eye which improved her vision, but since that time she again noticed that vision was gradually becoming worse.

Examination of right eye: media clear, large iridectomy up and slightly out, nuclear cataract thru which the fundus could be indistinctly seen appearing as normal; vision, counting fingers at eight feet. Left eye: iridectomy wound, total cataract, no light perception, tension normal or slightly minus.

She was kept under observation until August, 1918, at which time I entered the army and had no occasion to see her until May, 1919. At this time the examination showed an increase in the cataract, with corresponding loss of vision. In December, 1919, her family physician found considerable sugar in the urine, which cleared up readily with a proper diet. Shortly afterwards, her own oculist returned to the city and she was transferred to him, returning to my care in January, 1921, after her oculist had again left the city. This time she gave the following history:

That her oculist had felt that in consideration of the fact that she only had one eye, it was advisable for her to wait until the cataract was fully matured. Being impatient to have her vision restored, she had gone to an eastern city where she was operated upon September 30, 1920. The eye was kept bandaged for six weeks and never fully cleared after the operation. Two weeks previously, the eye had become very much worse, with marked inflammation and pain and increased impair-

ment of vision. During this time, she had been treated by the eastern oculist by letter and telegram, who advised the use of 1% atropin sulphat solution.

On examination, the eye showed marked inflammation, no increase in tension, cloudy cornea, exudate in pupil with no view of the fundus, ability to count fingers at five feet. Trace of sugar in urine. Over the corneal surface could be seen a fine network of vessels coming in from all directions, but principally from the top. The strength of the atropin was increased, but had no effect on the size of the pupil. X-ray of the teeth showed one molar with an abscess, which was extracted. Several doses of antidiphtheria serum were given with no result. At the end of ten days, sodium salicylat, 150 grains in 24 hours, was given for three days, with two days rest. Like treatment was continued for four months, with temporary improvement in the pain and redness during the days she was under the influence of the medicine. There was a gradual increase in the pupillary exudate, until there was left only a small dark spot at the extreme upper part of the iridectomy. If the rest periods were extended over three days, the pain would recur with its old intensity. In February, Wassermann blood test was made and again found negative. Dermal test for tuberculosis showed marked activity; t.b. fixation showed four plus with 2/10 c.c. of the patient's serum.

On March 14th, the left eye was enucleated with apparently slight improvement in the right eye, the salicylates being discontinued for seven days, when the trouble recurred again necessitating their use. The enucleated eye was divided into three parts, one part being used in an attempt to make an antigen with normal salt solution. One of the other thirds of the eye was digested with antiformin and the result of the centrifuged matter was injected into a guinea pig with no result. The other third was hardened, imbedded and ready for sectioning, when a fire in the laboratory destroyed it.

In April, finding that salicylates were producing no permanent improvement, I decided that the positive

skin reaction and positive complement fixation tests were sufficient to warrant beginning the use of tuberculin. Being afraid of too great a focal reaction, the initial dose was 1/100,000 of a milligram. This was gradually increased with no reaction until the latter part

ported by Gradle<sup>9</sup>, I had a white cell count and a differential made on the four cases, also testing each of them for the t.b. complement fixation and the dermal test with the antigen from the enucleated eye, the results of which I herewith tabulate:

	WHITE COUNT						T. B. Fix- ation	Wasser- mann	Antigen
	Total	Polys.	S. M.	L. M.	Trans.	Eos			
Miss B. (tb.) .....	5,600	75	13	12	..	..	Negative	Negative	Negative
Mrs. D. (tb.) .....	9,300	58	25	13	..	4	Negative	Negative	Negative
Mr. T. (S. I.) .....	18,000	61	29	9	..	1	Negative	Negative	Negative
Mrs. W. (S. O.) .....	10,700	37	56	5	2	..	Positive (XXXX)	Negative 0.2 cc.	Negative

of June, when the patient had a general and local reaction with 1/500 of a milligram. The condition of the eye was such that it could not be determined whether or not there was a focal reaction. From that time the salicylates were gradually decreased and their use finally stopped. Tuberculin was continued once a week, never reaching higher than 2/100 of a milligram.

In May, 1922, the eye having been quiet for eight months, with the tension about minus two, vision of hand movements, localization in all directions and projection of 15 feet, an iridotomy with a Ziegler knife was performed, but the opening closed giving no improvement in vision. At the present time, she is still under treatment with small doses of tuberculin, with another iridotomy to be done later.

During the time of handling the case of sympathetic ophthalmia, I had under treatment two cases of intraocular tuberculosis and a case of sympathetic irritation in a tuberculous patient with slight activity in his lungs. Keeping in mind the leucocytosis re-

You will notice that the antigen tests on the four patients are negative. Whether this was due to faulty technique in its manufacture, or whether the eye was placed in formalin, I am unable to say. It is of interest to note that the case of sympathetic irritation in the patient with active tuberculosis of the lungs gave a negative fixation test, while the case of sympathetic ophthalmia with negative findings in the person of more than ordinary good health, gave a positive. The case of sympathetic ophthalmia also showed a large excess over normal of small mononuclear cells.

CONCLUSIONS: Whether the case reported is sympathetic ophthalmia or tuberculosis I am unable to say, as clinically and therapeutically there seems to be no way to differentiate between the two. I hope within the next few months to be able to report some conclusions on my experiments, which may be of value in determining the etiology of sympathetic ophthalmia, or differentiating this disease from ocular tuberculosis.

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## GRADUATE TEACHING OF OPHTHALMOLOGY.

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The need for three kinds of graduate courses on ophthalmology is pointed out: 1. For those entering upon special practice of ophthalmology. 2. For general practitioners compelled to do certain branches of ophthalmic practice. 3. Specialists desiring instruction on particular parts of the specialty. The ways in which these needs may be met are also stated.

The problem of the ophthalmologic graduate school is to offer courses which will adequately meet the requirements of those seeking ophthalmic training.

A review of the literature of the last ten years on graduate teaching in ophthalmology, reveals a general agreement that there is great need for graduate teaching in this specialty, and that the opportunities in this line, tho much better than they formerly were, are still quite insufficient.

The amount of time suggested as the minimum for graduate courses by different writers varies tremendously. Duane<sup>1</sup> believes that a seventeen weeks course, tho not sufficient to give a man full training, could give thoro training in fundamentals and be sufficient to enable him to handle most cases with intelligent knowledge and reasonable skill. Verhoeff<sup>2</sup> outlined a two years course, making no provision for courses shorter than this. Lancaster<sup>3</sup>, reporting for the American Board of Ophthalmic Examiners, outlines a very comprehensive two years graduate course, which is the course that this Board recommends.

All are in agreement that a thoro grounding in the fundamentals of the special anatomy, physiology, etc., is the first essential in any good course. Wiener<sup>4</sup> suggests six weeks of ground work in an outlined course of six months; while Duane would devote twelve of the seventeen weeks of his course to the fundamentals.

I am heartily in accord with the general ideas of long and complete courses for those desiring to take up ophthalmology as a specialty, but there is another class that needs the help of graduate teaching in ophthalmology. I refer to the general practitioner who finds, because of his situation, he is forced to do whatever of eye work is to be done in his community. There is a

tendency to regard the general practitioner who seeks ophthalmic graduate training as usually a man who has made a failure of general practice, and desires to take up a specialty as an easy means to a lucrative practice. This may be the situation in the thickly populated Eastern States, where an oculist may be found within a radius of a few miles, but in the West and Middle West, cities are farther apart, and often it is impossible to send the patient with eye trouble the necessary distance to an ophthalmologist. The general practitioner who seeks knowledge to help these people is distinctly deserving of our assistance, and his education should constitute an important part of our graduate teaching.

In general, applicants for instruction in eye work fall into three groups. The first class is composed of physicians practicing in communities where the doctor must employ every branch of medicine, because of lack of specialists to whom he can refer cases. The second class is composed of physicians who desire to practice ophthalmology as a specialty, alone or combined with ear, nose and throat. The third class includes the practicing oculist who desires special training in some particular branch of the specialty.

Regarding the physicians in the first group, they have the choice of sending their eye patients to their ophthalmologic colleagues in a large city, to an optometrist or other non-medical man, or of taking care of the patient themselves. Quite obviously it is very frequently not feasible to send the patient on a long trip for a minor ailment, or for a simple refraction. The second choice, that of sending the patient to a nonmedical man is contrary to the physician's training, and may be severely detrimental to the patient. The last choice, that of

treating the patient himself, finds the physician unprepared to handle the case. The doctor has not the time for a long course in ophthalmology, but desires a course which shall enable him to give first aid, as it were, to eye cases.

In short courses, it is impossible to teach the entire subject of ophthalmology sufficiently thoroly for the graduate student to learn enough to enable him to practice eye work in all ophthalmic branches. The only excuse for such courses is that they might serve as reviews for oculists, but for this there is little demand. The oculist prefers to choose a specialty course, or a number of specialty courses.

The physician usually has found that there are some one or two branches of ophthalmology in which there is a particular demand upon him. For this type of practitioner we suggest short courses in the different branches of the specialty. In two months, the ground work, and a fairly good general knowledge of this branch, together with a little instruction in the necessarily allied branches, can be taught. This will teach the practitioner at least one subdivision fairly well. I think this better than a smattering of the whole subject of ophthalmology, which is all that could be taught in the same length of time. Such a course will act further as a stimulus to the practitioner to take later other special branches of ophthalmology.

In two months of intensive work in special courses which the physician feels would be particularly applicable to the type of patient which he finds it essential to care for, a sufficient training might be obtained for him to handle these cases with a certain degree of success.

I do not think that there is danger that the physician so trained will set himself up as a specialist. We must primarily assume the honesty of the applicant's intentions, or no course at all should be offered to him.

Such a division of the specialty is open to just and severe criticism. Admittedly all of the branches of oph-

thalmology are closely interwoven, but with the background of a medical school training, and even a limited knowledge of other branches, certain subdivisions of the specialty might be successfully practiced. It is not a question of the ideal but an expedient to meet a difficult situation. Surely to give the doctor as much as possible and let him use the knowledge thus obtained as well as he is able, is our duty as medical teachers. With a foundation of medical education and medical altruism, it is certainly better that the patient should be in such a physician's care, than in the care of those interested principally in commerce.

With regard to the second group of physicians, namely, those who desire to practice ophthalmology as a specialty; at least one year's course should be offered. The ideal course is interne hospital service and service in the dispensary. Only by following the patient from dispensary to the hospital, to the operating room if necessary, and thru the daily hospital course, can a complete understanding of the condition and the proper handling of the patient be obtained.

The average student constantly needs direction and must be given definite tasks for all of each day, in order to get the most out of his year's work. It is certain that the student who has only the afternoons definitely employed will not do as well as if the mornings also were assigned. It is easy to suggest original work and to outline a course of reading for the morning hours, but it will be found that a personal guide will tremendously increase the amount of the work accomplished. To do this satisfactorily, at least one full time instructor would be of great value.

Even in the absence of a hospital for eye cases and a full time instructor, a reasonably good course of one year can be given. There are two things which might be done in schools which do not have an eye hospital connection, that would greatly help the teaching. First, a definite number, even if a very small number, of free beds for the

use of eye cases referred from the clinic could be assigned. Were only one bed in each ward so assigned, if the ophthalmic staff could definitely count on that number, it would usually be possible to so arrange the hospital cases that fairly adequate bedside teaching might be done. Without such arrangements, more often than not, the patients on whom the students have been working, have to be sent to hospitals in different parts of town, rendering rounds upon these patients out of the question. The graduate student is missing a very important part of his training if he does not have demonstration on hospital cases, or much better still, the actual care of such patients. Secondly, there should be opportunities for refraction for the graduate student during that part of the day in which the teaching staff cannot be present. More than one-half of an ophthalmologist's practice is refraction, and with such opportunities students could study this important branch in the hours when, without a full time instructor, it is impossible to give them a guide. The students' work could be rapidly checked by the ophthalmic teacher at a later period. Alternate days may be used then for refraction and the study of anatomy and pathology; for much of which work, direct supervision is not absolutely essential.

The year's course should start once a year and be definitely progressive. Probably the best time for the start of this course would be in the Fall, at the time when most hospitals begin their interne year. This year's course, I think, should be the backbone of the ophthalmologic graduate teaching.

There may not be great demand for the year's course, because the young man who contemplates going into ophthalmology is more likely to choose an internship in an eye hospital than an externe course. Nevertheless, whatever of building is done by offering such a course will be done on the right foundation.

Regarding the third class, namely, the practicing ophthalmologists who wish training in special branches, such courses should be given for them by men known for work in the particular branch that is being offered. The busy practitioner will not take time for an eight weeks' course in eye operative work, unless it is given by some well known ophthalmologic surgeon. These courses draw from the oculists because of the men that give them, rather than because of what the course, as a course, offers.

I believe the eye department should offer these courses at definite times, and be prepared to give them to any properly qualified applicant.

These specialty courses should not be shorter than eight weeks, and each one should contain an adequate amount of ophthalmoscopy, because ability to make a fundus examination is a *sine qua non* for any ophthalmologic work.

In conclusion, let us offer thoro courses for the man desiring to practice ophthalmology as a specialty, but let us also study the ophthalmic needs of the general practitioner and offer the courses that will help him most. The latter I think will be best accomplished by giving short courses in special branches.

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# NOTES, CASES, INSTRUMENTS

## PARINAUD'S CONJUNCTIVITIS WITH EOSINOPHILIA.

T. WALKER WEAVER, M.D., AND W. G. GILLETT, M.D.

WICHITA, KANSAS.

White female, aged 31 years, had swollen right eyelids and large tumor mass on the right side of neck.

Her family, personal, menstrual and marital history are entirely negative. She works in a combination grocery and meat shop.

Onset November 5, 1921, with marked swelling of the right upper and lower lid. The eye watered and stuck together in the mornings. With the onset of the eye trouble, a tumor mass developed in front of the right ear and along the right side of the neck. The eye pained a little, but the tumor mass was not very sensitive. The patient felt badly and had a slight fever.

The above symptoms lasted about five weeks, and at the end of this time the eye symptoms and the tumor slowly subsided. At the end of ten weeks all the trouble had cleared up. Aside from the following findings, the *physical examination* is negative thruout: On the right side of the patient's head and neck there is a nodular tumor mass (probably glandular), which extends from the preauricular region above to the clavicle below.

*Eye Examination.* The left eye is normal and there are no glandular enlargements. The right eyelids are edematous and swollen shut. When the eyelids are opened, the bulbar conjunctiva is seen to be red and inflamed, but there are no granulations. When the lids are turned, the palpebral conjunctiva is seen to be very red and inflamed, and in addition there are many granulations which are not unlike trachomatous granules. In the center of the tarsal conjunctiva of the upper lid, the conjunctiva has assumed the form of a polypoid projection, measures about five millimeters and is thicker at the base than at the apex.

There are small, greyish white ulcers scattered here and there over the conjunctival surface. Cornea, ant. chamber and iris are normal.

*Ophthalmoscopic.* Extrinsic muscles and the fundus of each eye are normal. Vision, R. and L., 20/24.

*Laboratory Findings.* Wassermann, negative. Urine, negative.

The blood picture in this case is very interesting and instructive. At different dates during the height of the disease, five complete blood examinations were made, the counts were practically normal, there being a slight leucocytosis each time (8,000). The differentials, however, proved the existence of an eosinophilia of from 5 to 7.5%; which was constant during the disease, but which returned to normal when the patient got well. Three differential counts since the disease was cured have been normal. Eosinophiles running from 0.5 to 1.5%.

Neither local or systemic medication seemed to have any influence on the course of the disease.

*Conclusions.* We believe this is a typical case of Parinaud's conjunctivitis, altho the patient refused to have a specimen removed for histologic examination. It had a typical history, ran a typical course and had the typical clinical findings.

It is interesting to note, that during the disease the patient's blood contained a constant increase in the eosinophiles. A review of the published cases of Parinaud's conjunctivitis shows that there have only been two cases reported in which differential counts were made. In one of these, which was a typical case, there was an eosinophilia of 8%. In the other, which was a questionable case, there was a slight lymphocytosis.

This is an important finding, and if further substantiated will add an important differential point in Parinaud's conjunctivitis.

## UNSUSPECTED FOREIGN BODY IN LENS.

IRA A. ABRAHAMSON, M.D.

CINCINNATI, OHIO.

K. G., clerk, age 22. Unable to see out of right eye.

*History:* Negative up to one year ago, when patient had an attack of acute catarrhal conjunctivitis, which lasted for about three days. Vision afterward not impaired. At the time the patient thought a foreign body was in the right eye, but the attending physician could not find any. General history: negative.

On July 20, while playing hand ball, patient noticed that the right eye began to blur and shortly afterward photophobia and blepharospasm set in. No pain or lacrimation noted. Upon covering left eye, he was able to see only outlines of objects. The patient is certain he received no injury to the eye, and could see perfectly before this occurrence.

*Examination* showed the patient apparently in good health, lid movements unimpaired. Conjunctiva clear. R. E. vision 20/20 minus 1. Media are clear: Pupillary reaction to light, accommodation and consensual present. Fundus normal. Tension normal. Refraction: plus 0.25 cyl. axis 90°. L. E. vision fingers at 10 inches. Conjunctiva clear.

Opacity in the cornea, the size of a small pin head, situated about two mm. above the center. Slight depression, base smooth and pigmented, apparently superficial and old; no signs of injection present or past. Anterior chamber somewhat shallow. Color of iris good, no deposits, pupillary reaction to light present.

On focal illumination, lens appears gray, opaque, swollen thruout. Lying embedded in the anterior capsule, at about four o'clock on the dial, 5 mm. from the limbus, is a highly pigmented, spindle shaped deposit or object. Running from it to almost the equator, a rust colored streak of stain is noted. Another deposit is seen at about 9 o'clock, which is smaller and less dense. Both deposits are out of

direct line with the corneal abrasion. By means of the stereoscopic loupe, both the outlines of the object and stain can be seen distinctly. X-ray picture disclosed no foreign body.

*Comment.* This case is presented because of the following misleading features. 1. No history of any recent trauma. 2. Opacity on cornea was not on a line with lens opacity. 3. Corneal opacity did not have the appearance of having been a perforating wound. 4. X-ray picture returned negative.

It is known that the crystalline is wonderfully tolerant of foreign bodies. So much so, that it will sometimes retain perfect transparency for months, or even years, with one embedded sharply within its substance. It would not therefore be illogical to reason that the presence of the foreign body dated from the time the patient was told he had a catarrhal conjunctivitis 18 months previously, and that it lay embedded in the anterior capsule undergoing oxidation, and weakening the capsule at that point. Of course, iron being readily oxidizable, would ordinarily make it more potent for evil than any of the noble metals, or even zinc or lead, but its position rendered tolerance to decomposition better. Later, during the strain of playing hand ball, the capsule ruptured, thus admitting the aqueous contact with the lens substance, resulting in the opacity of the lens.

*Treatment.* The patient was taken to the hospital where the eye was prepared. The tip of the Hirschberg hand magnet was applied to the cornea, and immediately a slight shock was felt. On the removal of the magnet, the foreign body was seen lying on the iris. An incision was then made with a keratome close to the iridic angle, facilitating the removal of the foreign body. The latter was grasped with iris forceps and withdrawn from the anterior chamber.

When seen six weeks later, the lens had completely absorbed, and the patient had made an uneventful recovery.

## INDIRECT RUPTURE OF SCLERA.

AARON BRAV, M.D.,

PHILADELPHIA, PA.

Indirect rupture of the sclera is not a common condition. It is occasionally met with in elderly people, where the scleral tissue is harder. It is rather rare in children, for the sclera is still somewhat elastic and yielding. Rupture of the sclera is caused always by some trauma. It is usually associated with hernia of the iris, aniridia or subluxation of the lens. In some cases the lens has been delivered thru the scleral opening. In a case I had the opportunity to observe, the rupture included only the conjunctiva. The injury is usually caused by a heavy blow with a blunt instrument. The case reported is of interest from the fact that it occurred in a young boy, and that he had an uneventful recovery, retaining practically normal vision.

R. G., age 13, was brought to the Jewish Hospital, July 27, giving the following history: "He was sitting on a coaster wagon in an ice plant, when the ice man attempted to put a piece of ice on his wagon. The tongs slipped and hit the boy a heavy blow on the left eye.

I saw the case 6 hours after the injury and noted the following condition: Left upper lid slightly edematous. Horizontal linear superficial cut, which was cleansed by the resident prior to my arrival, involved only the superficial layers of the epithelium of the skin. Cornea was clear, anterior chamber shallow, pupil oval, drawn upward, adherent at upper limbus, anterior chamber contained some blood, pupil did not react, vision reduced to light projection. At the upper corneoscleral margin, there was a laceration of the conjunctiva and sclera. The rupture was in the shape of an inverted letter T, the horizontal line about 5 mm., the vertical line about 8 mm. No hernia of iris, no tissue protruding from the wound. The choroid was visible and intact. Eyeball very soft.

The boy was prepared for operation

and three scleral stitches placed, including the conjunctiva. One stitch was placed horizontally and one on each side of the vertical tear vertically. (See Fig. 1.) Atropin was instilled and bandage applied. Tension was very low, the eye was very flabby.

7, 29. Bandage removed, anterior chamber clear, pupil dilated, somewhat oval. No hemorrhage, light projection good, but eyeball very soft. Eyeball slightly injected. Slight red reflex seen with the ophthalmoscope. Two stitches hold firmly, one is cut thru. No pain.

7, 31. Eyeball less injected, but slight black pigment seen in the place where the stitch did not hold. Wound was clean but eye still soft. Ophthalmoscopic examination shows vitreous clearing, optic nerve and retina seen, but very hazy. Eyeball moves well.

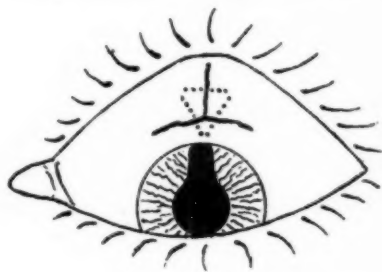


Fig. 1. T-shaped rupture of sclera above cornea, solid line. Three stitches shown by dotted lines. (Brav.)

Counts fingers at one foot distance. Wound cleansed, and a 4% silver nitrat solution applied to the edges of wound and atropin instilled.

8, 2. Cornea quiet, anterior chamber clear, tension minus. Media still hazy, optic nerve and retina hazy, no hemorrhage, no detachment of retina, slight gaping of wound. Silver nitrat applied to wound.

8, 7. Eye quiet, practically free from inflammation, only the site of the wound is injected. Vision improved, wound is healing, pigmentation seen in gap of loose stitch; tension still minus.

8, 10. Eye quiet, free from pain, no injection, slight redness of area of wound which is healing, stitches removed, tension minus.

8, 12. Eye quiet, media clear, nerve hazy on nasal side, retina wavy above. Probably partial detachment of retina. Silver applied to wound.

8, 14. Eye quiet, wound closed, tension normal, vision 5/12, no pain. Silver applied.

9, 4. Wound closed, some pigmentation visible in scar, vision with plus 2. cylinder, axis  $135^\circ = 5/9$ .

9, 25. Eye quiet, no injection at site of wound, media clear, disc oval, well defined; good color. No changes in the retina. Vision with plus 0.75 cylinder axis  $95^\circ = 5/6$ .

10, 6. When seen last, eyeball quiet. Slight pigmentation in cicatrix. Wound healed and quiet. Discharged cured.

Ruptures of the sclera do not always

run such a favorable course. They usually run an unfavorable course, as some parts of the contents of the eyeball protrudes thru the wound. The lens is occasionally found subluxated beneath the conjunctiva, in cases where the conjunctiva remained intact. Rupture of the sclera must be regarded as a serious injury to the eye, as the force strong enough to rupture the sclera also does some damage to the iris, lens, vitreous, choroid and retina. One must also think of the possibility of subsequent infection. Most cases of scleral rupture terminate unfavorably, and the eye has to be enucleated. Recovery with good vision is the exception. In my case there were no complications, no protrusion of tissue, no involvement of the choroid and retina.

## SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

### NETHERLANDS OPHTHALMOLOGICAL SOCIETY.

December, 1920.

PROF. G. F. ROCHAT presiding.

#### What Becomes of Patients Operated on for Glaucoma?

J. H. A. T. TRESLING examined 13 cases of glaucoma simplex, who had been operated in the Groningen clinic and whom he was able to follow for a long time. Scleral trephining had been done. Where the early judgment of the result had been favorable, in the long run this operative procedure has not been able to check the glaucomatous process.

The advantages of the trephining are not denied; in a few cases, even after years, the result remained very favorable, altho in nearly all cases a decline, sometimes slight, was noticed. The rise in tension had been combated in all cases, with consequent lowered tension in some cases. The visual field was found increased often in the beginning, but mostly later became smaller; the same was found with the visual acuity.

Tresling concludes that the poor results are the more numerous, the worse the condition before the operation, and the longer the time of observation after the operation. Where a scotoma or narrowing of the field had progressed to near the fixation point, blindness has never followed. This is of more value if the other eye before had become blind. This belongs to the active side of the trephining. Notwithstanding the tension has been lowered, the condition of some eyes declined. This proves glaucoma simplex is not a simple increase in tension, but a pathologic condition, the true origin of which we do not yet know.

The more favorable results are found in the younger patients, where the peripheral visual field is rather intact. It may, therefore, be advisable oftener to treat old people more conservatively. When pilocarpin does not lower the tension, or where social conditions do not allow us to expect a regular instillation of myotics, we will often be obliged to operate.

Nobody will deny the dangers connected with trephining; but glaucoma simplex is a very serious, perhaps incur-

able disease, against which a satisfactory treatment is not yet found.

*Discussion.* WAARDENBURG thought the conclusions of Tresling pessimistic. His longest postoperative experience is six years, and the future must show what the end results are. Sometimes he observed after operation diminution of the visual field, but mostly only peripherally, while the Bjerrum scotomata remained the same, or decreased in size. Smaller ones disappeared sometimes, or became relative. He was amazed in some cases, with very small remainders of the field around the macula, at the remarkably long preservation of the central vision. The observation, that extremely small fields, which include the macula, or a part of it, can possess good vision speaks in favor of Igersheimer's opinion, that the papillomacular bundle is only a 1/10 to 1/15 of the nerve section, not 1/3 as Tresling and the older writers have mentioned. The observations in glaucoma also indicate that this bundle cannot reach the temporal border of the disc; but must be surrounded by fibers which end more peripherally in the retina. The average of tension diminution in his cases is greater than in Tresling's cases. For years he found in his operated cases only small change in visual field and vision.

Ophthalmologists must discover glaucoma as early as possible. The typical symptoms as described in the books are not always found in the beginning. Important are complaints of headache, weakening of the accommodation, rise of tension. A circumpapillary halo and misty vision may mean something. One has to be careful in the valuation of the phenomena; but the prescribing of pilocarpin too often will do less harm than too seldom; rise in tension plays a larger part in the complaints than is recognized.

ZEEMAN liked the detailed description of a few cases, which is often of more value than a large series of numbers. It is also his experience that there are cases which go slowly downhill as to vision altho the tension is absolutely normal. Against these, there are cases where the operation has a splendid result. This different behavior must be explained by

the differences which exist in different glaucomas. The familiar glaucoma simplex will run differently from a glaucoma which sometimes originates after a cured choroiditis, or from the peculiar glaucoma simplex of very old people, which suggests atrophy with excavation. It must be our task to make a more definite prognosis according to the origin.

VAN DER HOEVE likes this investigation, because it brings him information about some of his operations. It is very agreeable that the results are in general above expectation. In two patients, each with a blind eye, the other eye had normal visual acuity, but with a Bjerrum scotoma very near and progressing toward the fixation point. Both preserved for years after the operation, normal acuity and good visual field, altho in both instances the disc of the good eye appeared totally atrophic, with an excavation of 7 to 9 D., so that ophthalmoscopically hardly a difference could be noticed between the blind and the seeing eye. The operation here certainly stopped the process. The progression after a successful operation must be due to progress of the atrophy, which is not stopped.

He favors examination of members of the family, if it does not lead to too quick operation. It seems to him best to determine, if possible in the hospital, with how little pilocarpin the tension can be kept low. If a few instillations daily are insufficient, he advises operation. Patients who can be controlled regularly can be kept under pilocarpin, and should be advised operation only when acuity or visual field begin to decline.

WEVE does not subscribe to the opinion, that trephining is never dangerous. Besides late infection, old arteriosclerotic people with high blood pressure are especially endangered. A short time ago he saw a case, where two hours after Elliot trephining intraocular hemorrhages appeared, which necessitated enucleation and other measures, because of bleeding from the orbit after the enucleation. Prof. Koster has seen such a case after iridectomy. In general his experience tallies with Tresling's, and he would not like to give up the operation, notwithstanding the often insufficient results,

for the unmistakable successes in other cases. In judging the condition of the operated we must consider, that glaucomatous patients often show a distinct day-curve of pressure. Weve has 3 patients with chronic glaucoma, who show distinctly a temporary serious decrease of vision after instillation of miotics. In very soft eyes, to which Tresling called attention, he found fistulization thru the conjunctiva, only visible in edematous swollen conjunctiva. These fistulae may be the point of entrance of late infection, which Weve, happily, did not encounter during the last 5 years.

ROCHAT has the impression that all glaucoma patients do badly if followed long enough. Tresling's investigation of the Groningen patients has strengthened his opinion.

TRESLING had formerly a more favorable impression of the course of glaucoma simplex. He recognized that the progress in the long run is less favorable. He wants to use trephining only in the beginning, or when other means fail to keep the tension low. He agrees as to its dangers.

#### **Affection of Optic Nerve in Encephalitis Lethargica.**

P. J. WAARDENBURG mentioned the importance of ocular symptoms in this disease. He described a case of double ring scotoma due to retrobulbar neuritis, no inflammatory symptoms being detected at the disc. Paleness of the disc and the lowered visual acuity are in favor of this. Bartels has described a paracentral scotoma with diminution of V., where he noticed a temporary narrowing for green, and a few times paleness of the temporal side of the disc. (See A.J.O. v. 4, p. 580.)

*Discussion.* HALBERTSMA asked why affection of the supranuclear paths is accepted for lateral gaze paralysis, and not for vertical gaze paralysis, while many accept gaze paralysis with affection of the abducens nucleus. If this is with true ptosis, even with a narrow pupil, affection of the sympathetic can be excluded with certainty.

WAARDENBURG answered that no indications of a sympathetic paralysis were present.

#### **Sensibility and Drying of the Cornea.**

E. MARX describes chiefly physiologic investigations on himself. He feels even the weakest touch with the softest object; the sensation possesses always a disagreeable character which should be classed under the pain sensations. With von Frey, he considers that the cornea does not possess an ordinary sense of touch, but an extraordinarily developed pain sense. This pain sense is differently developed in different people.

Marx never observed warmth by the cornea; the touch of a cold object he sometimes recognized as such. He felt a peculiar cold sensation thru moving air on the cocaineized cornea. Because this temperature sense is so little developed, it is normally overruled by the much stronger and finer pain sense, but if this is extinguished, then the much weaker cold impression can be recognized. The localizing powers of the cornea are not much developed. This agrees with a formerly expressed opinion that the sensations from the ocular mucous membranes do not influence the sensation of the position of the eye.

Marx pressed the cornea at 33 different spots, using a hair with 10 mg. pressure. This force was observed 13 times; a hair with 25 mg. pressure 29 times; and one of 125 mg. pressure on all touched points. Marx examined with a 75 mg. pressure hair the corneas of 50 normal people, emmetropic or nearly so. The hair must have a curvature or be perpendicular to the handle, so that one can see what one does. The hair must be put with care on the cornea, so that it makes a small pit in it. These pits remain a few seconds, so that the series can be followed. Often a contact is not perceived, altho the reflex thru this contact, that is winking, follows. The relation of this unconscious reflex motion to the excitation has still to be investigated.

Not all contacts are equally felt, altho all the same; one touch was felt stronger than another, and this different sensibility is distributed accidentally over the cornea, perhaps one touches at a time a nerve, at another beside one. The perception of the touch continues during the examination. After having touched

in a certain tempo, the examinee still reports feeling something, with the same intermissions. Mock motions must be interspersed, because the patient sees the hand, and not more than 4 times in succession must he be touched. Marx found that the sensibility increases from the periphery toward the center, altho not regularly. Peripherally the sensibility increases more rapidly than centrally, while the center represents the most sensitive part. This central part has a diameter of about 5 mm. The right and the left eyes perceive about alike. The individual sensibility in normal eyes is very different. No great differences can be detected between the nasal and temporal sides. The perceptions in the horizontal line are slightly more than in the vertical. Eyes with a less developed pain sense have the noticed perceptions usually concentrated in the center.

The *desiccation* of the cornea cannot be investigated so easily. Marx observed it accidentally years ago in a patient with a foreign body under the upper lid. Some seconds after the eye was opened, quite a number of small pits appeared in the cornea. This was also found in scrofulous changes, during the healing of erosions, sometimes in the surroundings of the ulcer, with chronic iridocyclitis and some other conditions. But he found it also in normal eyes, and remarks on it in the literature. Long known in animals, it has played quite a role in the pathology of corneal changes after resection of the trigeminus.

For observation of this desiccation, the patient must keep the eye well open and as quiet as possible. One sees an iridescent layer, if a not too fatty secretion from the Meibomian glands is present. Then appear smaller or larger pits, which lie deeper than the surrounding cornea, which appear dry and without luster. All the water is evaporated in these pits. The pits have different forms, round, oval, bifurcated, as a line, single or in a great number, either on the margin or in the center, without regularity. Marx has the impression, that they appear more and quicker temporally than nasally. Fuchs found his, entirely different pits, twice as often at the temporal as at the nasal side. It sug-

gests unexplained nervous influences. Also one is reminded, that phlyctenules appear so much oftener at the temporal side than at the nasal one. The pits appear in the normal cornea in time between 10 seconds and 6 to 7 minutes.

A quick desiccation and low sensibility of the cornea go often together. But also with an increased sensibility pitting is found. A normal sensibility is rare. We must suppose with subsensibility, that the sensitive nerve fibers are impaired in their action, while with hypersensibility these are excited by the inflammatory changes in the cornea. Besides these changes in the sensibility, there exist trophic disturbances, which express themselves in the quick appearance of pits, which cannot well be ascribed to the same nerves.

*Discussion.* ZEEMAN had observed such pits after trephining.

NICOLAI mentioned that the removal of a foreign body from the corneal margin is much more painful than from other parts of the cornea, which is apparently in contradiction with Marx' observations. Does cocain penetrate less well at the periphery? According to MARX, it proves that these parts are made less readily painless, and does not speak against his results.

#### Damage of the Eye Thru Lightning.

P. J. WAARDENBURG was consulted by a lady, 23 years old, who had been unconscious the previous evening after lightning had struck the chimney in her room. She regained consciousness some 20 minutes later and complained of pain and redness of L., which had V. = 5/24, no improvement with lenses; R. = 5/5. Left pupil 2.5 mm.; right 3 mm. The left iris was hyperemic with pericorneal injection and slight pericorneal chemosis. In the deeper layers of the cornea were opaque vertical lines. On the following day, there were irregular opacities in the superficial corneal layers, especially in the upper nasal quadrant. V. L. = 4/60.

During the following week the entire surface of the cornea became opaque; line and island like confluent opacities in the deeper and middle layers, and many point and spot like small subepithelial opacities. The pupil dilated only to 5 mm. under atropin and eccentrically

at the nasal side. To the nasal side of the center of the anterior lens capsule was a point like opacity. In the temporal side at the periphery appeared an extensive pigment atrophy, so that the sclera was visible. Rather sharp pigmented lines bordered the atrophic spot upward and downward.

Some 6 weeks after the beginning the V. was 5/12 to 5/8. The eye is quiet, anterior chamber and cornea clear. The lens shows opacities. The corneal microscope and slit lamp show white sub-capsular opacities, of fantastic shapes, chiefly opposite the pupillary margin; at the posterior pole a more star like and diffusely extended opacity, and some peripheral opacities. (These lens opacities arose, therefore, 4 to 8 weeks after the accident.) The existing anisocoria increases in the dark. The pupillary reactions are normal. The right iris is blue-gray, with olive-brown pigment at the small circle; the left blue-gray with more flimsy stroma and without stroma pigment.

After 3 months, the right pupil dilated excentrically downward, 15 minutes after cocain instillation; while the left iris remained the same. The left iris appeared darker than the right, especially in the periphery, because the posterior layer appeared thru the fine texture. Homatropin dilated the right pupil fully, the left one to 5 mm., oval and excentrically toward the nasal side. V. after correction, 5/10. At the left side, therefore, a sympathetic paralysis existed, with heterochromia thru pigment aplasia of the left iris stroma. Waardenburg considers this to have been present before the accident. The tendency of both pupils to dilate excentrically speaks against a local recent cause. The iris epithelium was uninjured, not diaphanous. The lightning must account for temporary clouding of the aqueous and cornea, cyclitic irritation, progressive lens opacification and inflammation of retina and choroid. The patient had no visual field changes on the Bjerrum screen. The patient never had noticed before any color difference of her eyes.

*Discussion.* ROELOFS asked if the iris atrophy was a diffuse or circumscribed process. He has observed a case of

electric ophthalmia (thru shortcircuit), after which a very marked atrophy of the stroma iridis appeared in circumscribed spots.

#### Barraquer Operation.

E. MARX gave a kinematographic demonstration of a film from Barraquer, which showed his operation of phacokerisis.

#### Hemianopic Central Scotoma.

H. J. M. WEVE read a paper, not yet published.

*Discussion.* VERWEY stated that in such cases the examination of the visual field is not simple. When Weve speaks of changes of 10 minutes, he refers to Hess' article, who demonstrated that the shadow of a blood vessel can extend 30 minutes and that we cannot well speak of a point like image on the retina. Verwey finds that the involuntary fixation movements extend about 15 minutes under the most favorable circumstances, and ought to be estimated at 30 minutes with the usual perimetry. Then, in examining the visual field a double attention is wanted. How difficult this is, everybody can find in measuring his visual acuity 5 degrees outside his fixation. Theoretically the double attention is a contradiction. By fixing the attention at one point, the other becomes neutralized, and the degree of this neutralization can never be measured. He mentioned a simple experiment: Using one eye, he fixed carefully the vertical dividing line between a strongly illuminated white and a black field; so that after a while, a sharply circumscribed scotoma appeared, the dividing line of which went thru the macula, and the cause of which must be situated in the peripheral retinal elements. With this temporary scotoma taking his visual field, it appeared without any doubt that the fixation point, and a degree around were free. This probably must be explained by the impossibility of using the macula as a fixation point, when it is divided by a scotoma.

It needs little argument, to prove that the so-called "saving of the macula" must be used with the greatest care, as demonstrated for the double sided central projection of the macular fibers. If we

add the suggestion, which is inherent to the tone of the question and the difference which must be found in the form of the field, if one goes from the blind to the seeing, or from the seeing to the blind parts, then it is not saying too much to state, that the results of the perimetric examination are often overestimated and misused.

MARX said, that Weve probably meant a sparing of 30 minutes and not seconds (W. affirms this). This can very well be demonstrated in the macula, because vessels are absent there, and especially this is easy, when a ring like fixation is used.

WEVE knows well the objections of Hess against the point perimetry. They are of no value for his visual fields; these are taken with an object of 1 cm. at 2 m. distance. Our campimeter findings don't register absolute values, and woe to our science if we could not compare mutually these relative values.

#### Conservative Treatment of Dacryocystitis.

H. C. HOLTHUIS lays particular stress on the bacteriologic examination of the secretion of the diseased lacrimal sac. He found diplococci, pneumococci, staphylococci, streptococci and diplobacilli with capsule. In 4 cases he did not find bacteria. They appear single or combined. With diplococci infection, sulphat or salicylat of zinc are recommended. The lacrimal sac is syringed with 1, 2, or 4%. With a simultaneous conjunctivitis, the entire conjunctival sac is treated with a 2% solution. A corneal ulcer gets a 10% solution. The patient receives for home use a 0.5% solution. In pneumococcal infection optochin is used, and in staphylococcal and streptococcal infection silver nitrat in 0.2 and 0.5% solution is used. It is desirable not to begin with probing. Patients are treated once a week. Case histories were given.

**Discussion.** VAN DER HOEVE is opposed to the name dacryocystitis congenita, as the dacryocystitis is secondary to the occlusion of the nasal end of the duct. The dacryocystitis must, as much as possible, be prevented thru regular expression of the sac, or if this does not produce the result, by a single sounding.

If the stenosis is not relieved, a tenacious, nearly incurable, disagreeable dacryocystitis results.

DUBOIS observed that the congenital dacryocystitis nearly always heals by itself, even if one does nothing, and that probing is not necessary, if one can wait.

WAARDENBURG does not understand, why a single probing should be opposed; it is always sufficient and can be mostly done without narcosis.

VAN DER HOEVE answers Dubois that unfavorable experiences demonstrate more. He has seen some cases of very *tenacious dacryocystitis* after congenital stenosis. One must be careful with probing in these young children; it must be done only when expression does not help.

#### Congenital Disturbances of Motility.

P. J. WAARDENBURG wished to communicate some experiences from his practice. 1. Case of a family with hereditary disturbance of the left eye. In a family with 11 children, the oldest of which had died, the father, the second, fifth and seventh child had the same disturbance. With orthophoria and binocular single vision, an abducens paralysis and a medial rectus paresis are present. The motion inward is limited, the eye turns in and upward, the upper lid sinks in, the palpebral fissure becomes narrower and enophthalmus results. The 17 years old son could move his left eye somewhat better inward than his father or his 21 years old sister. The refraction of all was emmetropic or slightly hyperopic. The corneal refractions differed a couple of diopters in the different persons.

Since Duane published 52 similar cases from the literature (1905), Rost described 6 new cases and Hoefnagel 11, 2 of which were his own observations. Only in the case of Heuck, retraction of the bulb happened with every bulbar motion, because all muscles were attached posteriorly to the eyeball. Mostly difference in height and often amblyopia is present. The left is about 3 times as often affected as the right eye, and both eyes in not over 10% of the cases. The bulbar retraction is ascribed to a retractor bulbi, which Axenfeld assumes when retraction is absent with passive adduction and present with active; or to too

much posterior insertion of the rectus, where a temporal fixation by an elastic band, in the place of the external rectus, can act as a support. A series of cases were reported.

The most remarkable case could be called a see-saw motion of the eyes in vertical direction. When the one eye looked downward, the other moved upward and reversely. The lateral fixations were undisturbed. Waardenburg accepts a central cause. It may be, that the nuclei of the superior and inferior recti of one eye have changed place, and so are faulty connected with the supranuclear vertical fixation path, or that the cause is a wrong fiber distribution of this path, with rightly situated nuclei. The first is the most probable. The images of the left eye have been suppressed, so that this eye is amblyopic.

The diagnosis method of Hess can be considered a gain thru the quick way of examination. It disappoints now and then; it is very difficult to find red-green glasses which are able in their size and form to overlook entirely for each eye its fixation fields, without disturbing reflection and without troubling the other eye, and without their becoming dim in the cold. Still more difficult is the choice of the colors of the glasses, of the spots, and the moving object, that they are not glossy and are complementary, so that they are seen clearly thru the one glass and totally neutralized by the other. It happens often thru the different illumination, that the green glass shows the red spots as dull-gray, or the indicator in a dull-gray tint thru the red glass. W. finds that Hess took the distance of the spots too short. They are separated mutually and from the center  $15^\circ$ . The entire ocular motion takes place between  $30^\circ$ . The distance is 0.5 m. Many pareses will not be recognized on account of the short distance of the spots. He found often that the paresis only was detected when the eye turns about  $40^\circ$  and in some directions more. It is therefore advisable to place the patient at a distance of 1.5 to 2 m., and to let the green point move between 2 red points. It remains then thru the red glass black on black and does not betray itself monocularly. The principle of the method does not suffer thru this change.

*Discussion.* WEVE asked if, in the case where the one eye turned upward when the other went downward, the excitability of the labyrinth has been investigated. Such a position is seen in rabbits after monolateral labyrinth extirpation, and was seen by Bartels with a one sided otitis media. WAARDENBURG stated that this examination did not take place as patient went away on the same day.

DE KLEYN observed that the ocular deviations seen after monolateral labyrinth extirpation in rabbits, and observed in some human cases (eye at the side of the affected labyrinth downward, the other eye upward) are of tonic quality, and should not be compared with the spontaneous ocular motion to which Waardenburg has referred.

*After Images.* WEVE gave an address about after images, not yet published.

## ROYAL SOCIETY OF MEDICINE, LONDON.

### Section of Ophthalmology.

October 13th.

MR. A. L. WHITEHEAD, (of Leeds).  
President.

#### Degeneration of Iris.

DR. RAYNER BATTEN showed a man with calcareous degeneration and a deposit on the iris. When two years of age the right eye was injured, and the lens appeared to have been absorbed.

#### Cyst of Retina.

DR. J. A. VALENTINE showed a case of cyst of the retina, the patient being a woman, 26 years of age. She had never been out of Portsmouth. Eighteen months ago, she noticed a line moving in front of the right eye. She was found to have 2 D. myopic astigmatism, and the axis was down and out  $15^\circ$ . At first he thought of the possibility of it being cysticercus, but no confirmation of that view could be obtained.

*Discussion.* MR. TREACHER COLLINS agreed with the diagnosis, and commented on the rarity with which such a case was seen ophthalmoscopically, tho the discovery was common in pathologic specimens. One such case he saw, and it was regarded as gliomatous and the

eye excised, the actual condition being revealed afterwards.

DR. VALENTINE, in reply, said one member expressed to him the view that it might be tuberculous disease of the choroid, and that it was supported by there being a similar shaped white area two discs distance lower down.

### Angioid Streaks in Retina.

MR. WILLIAMSON-NOBLE showed a patient with angioid streaks in the retina. The only positive result in the investigation of the case was that the patient's complement fixation reaction to tubercle was positive.

### A Retinoscope.

MR. WILLIAMSON-NOBLE also exhibited and demonstrated a plane glass retinoscope, for use without a mydriatic. It consisted of two tubes, placed at an angle of  $30^\circ$ ; and where these joined a piece of glass was placed, mounted on screws to allow of adjustment. At the far end of the tube was a 30-candle power light. Projecting from the casing was a tube containing a 20 D. convex lens. A stop was placed between the lamp and the lens, and another stop beyond the lens. The glass was so arranged that a beam of light was projected down the center of the tube, at one end of which the patient was seated. Refractions could be easily determined by it, especially low degrees of astigmatism.

*Discussion.* THE PRESIDENT considered the instrument a very ingenious one, and there were great possibilities before it, particularly when further improvements suggested had been incorporated.

### The President's Address.

MR. WHITEHEAD then delivered his Presidential Address. After expressing his warm appreciation of the high honor accorded to him, he referred to the recognition of the specialty by his Majesty in conferring knighthoods on Sir John Parsons and Sir Richard Cruise. He had a sympathetic word for the loss by death of Edward Stack, of Bristol, and Charles Wray, of Croydon.

### Ocular Tuberculosis.

He devoted his address to a consideration of the subject of ocular tuberculosis. Tuberculosis was more frequent in Leeds

and less frequent in the West Riding of Yorkshire than in England and Wales as a whole. England and Wales, as a whole, had a tuberculosis case rate of 2.07, the lowest since 1914; that for the West Riding was 1.61. The case rate for Leeds was 2.61. Tubercular lesions of the eye were very rare in pulmonary tuberculosis, but if cases of ocular tuberculosis were followed up, it was often found that other manifestations were present. In 1921, Igersheimer and Prinz published a paper giving the results of following up 92 scrofulous eye cases for 10 to 30 years. In 13.9% there were changes in the lungs, and 13% had symptoms of active tuberculosis.

Mr. Whitehead considered there was an important difference between the severe spreading invasion of the eye, leading to more or less complete destruction of the eyeball, and the more chronic and benign forms of tuberculosis infiltration. In the former typical giant cells and tubercle bacilli were frequently found, but in the latter there was usually failure to demonstrate them. In these it was believed the infection was due to a tuberculotoxin acting on a specially prepared area. Miliary tubercles of the choroid were frequently present in acute tuberculosis of infants. In most of the fatal cases of tubercular meningitis he had examined, he had found miliary tubercles. These tubercles occurred in the same class of individuals as those having the less severe forms of tuberculous infection of the eye. They were a third to half the size of the optic disc, greyish-yellow, with a soft indefinite margin; later the circular clean cut edges of the atrophic patch were very characteristic. Usually they were not recognized until a later age, when vision is interfered with.

He had not seen primary tubercle of the retina, but he had one case of what he regarded as a nodule in the papilla, of tuberculous nature. Degenerative changes in vessels followed by hemorrhages, sometimes into the vitreous, had been described, and he had experience of two cases in which vitreous hemorrhages preceded other evidences of general tubercular infection, and in those patients pulmonary tuberculosis occurred

12 to 18 months after the appearance of the hemorrhages. Possibly some of the unexplained cases of recurrent vitreous hemorrhages might be due to toxin infection from a tuberculous focus elsewhere in the body. Schieck especially had reported favorably on the use of tuberculin in recurrent retinal hemorrhages.

Dealing with *tubercular iritis*, he said that in many of the milder cases of this condition the nodules were small, they disappeared early, and left but little permanent change in the iris structure. The subjects were usually young and apparently robust females, with no other evidence of tuberculosis, but with a family history of susceptibility to the infection. In these cases tuberculin treatment, in proper dosage, had been frequently of value. Hessberg considered that more than half of all cases of iritis were attributable to tuberculosis. Phthisis and joint tuberculosis seldom coexisted, but frequently the lymphatic glands of mesentery and mediastinum were affected. In the view of most ophthalmologists, the percentage given by Hessberg was much too high.

Involvement of the *lacrimal sac* by the disease did not seem to be common, but he had seen it secondary to polypus of the nose and as an extension of tubercle of the ethmoid. An epiphora might develop secondary to nasal tuberculosis; in one such case it followed tuberculous ulceration of the inferior turbinate. This patient, a girl of 12, also had tuberculous ulceration of the vulva, which was cured by local and general treatment. A year later her toe was amputated for tubercular dactylitis, and then the nose and lacrimal sac were affected, and later still the pharynx and larynx. During the five years these successive lesions had been developing, the child had maintained a very healthy look.

In *tubercular conjunctivitis*, the large subepithelial nodules leading to ulceration and large granulations were rare. With regard to the possible tubercular origin of the common *phlyctenular conjunctivitis* of children, Veeder and Hempelmann reported, in 1920, 196 cases of phlyctenular disease, and 93 of them gave a positive von Pirquet reac-

tion. In half the cases, tuberculous lesions were found in other organs, and of those kept under observation for a year or more, four-fifths gave evidence of other tuberculous processes. The President had noticed a type of phlyctenular conjunctivitis which he had come to regard as definitely tubercular. Occurring mostly in young adults, it was a very chronic type, and resistant to ordinary treatment. The phlyctenules were small and closely set, near the corneoscleral junction, and there was frequently infiltration of the cornea, with invading vessels. Ulceration was very rare. Iritis was sometimes present also. In all the cases there were evidences of a tubercular process elsewhere, or there was a family history of susceptibility to the disease. Examination of the tissue and inoculation gave negative results. Immediate and striking benefit followed the use of tuberculin in these cases. Tuberculin B. E. was used, and the initial dose was 1/5,000 mg. to 1/10,000 mg. according to age. Four hourly temperature records were taken for 24 hours with the patient in bed. Failing a general reaction or temperature, an increased dose was given three days later. When the reaction was obtained the dose was repeated, and if there was again a reaction, the dose short of this was given, and repeated at weekly or fortnightly intervals, according to the case. He had not had any experience of direct local applications of various dilutions of Tuberculin P. T. O. (bovine). Constitutional treatment was of great importance, as also was the searching for and treating any local focus of the disease.

With regard to the possibility of the mediastinal glands being the primary focus in cases of *toxin infection* of the eye, Professor Stewart had supplied him with some important observations. In 100 cases of death from rapidly fatal war injuries on men of good physique, there was evidence of tubercular disease in 42%, in 11% scarring at the apices of the lungs, and in 1% extensive old pleuritic adhesions. In 32 of the 100, there were signs of glandular infection, hence it seemed the primary focus in these cases of tuberculotoxin might be

the bronchial and other glands. Excision of the affected conjunctiva in some cases was tried, but without specially satisfactory results. The best results seemed to follow if a strip of conjunctiva 2 or 3 mm. in width was excised all around the corneoscleral junction, and the larger superficial vessels involving the cornea carefully scarified by the point of a Graefe knife. The value of peritomy had been emphasized by several ophthalmic surgeons, and he believed it to be one of the most valuable aids extant.

*Tubercular keratitis*, following infection after injury, he regarded as rare, as also was secondary infection from the conjunctiva, the ciliary body or the iris. In his experience, peritomy was of the greatest value in the treatment of the pannus of tubercular keratitis, tho it was valueless in congenital syphilitic keratitis; but the possibility of a mixed infection must always be remembered.

#### School Vision.

MR. N. BISHOP HARMAN read a paper entitled "Standards of Vision for Scholars and Teachers in Council Schools." He said the teacher's life was, in his view, a hard one; and short hours and good holidays did not insure against risk of strain to normal eyes. This risk was increased in cases having an ocular defect. The teacher's work, of course, was not limited to the energy expended

in the class room, as there was much preparation to be carried out. In schools worthy the name, there was also a large social element, the organization of which fell to the teachers in State schools, for here there were no officials such as prefects.

The State had provided an "educational ladder," rungs of which were scholarships, college, university training. It was a necessary corollary of this provision that the recipient of these advantages should have the physique to enable him or her to benefit by them. The absence of such physique meant wastage, and the physical failures probably kept out better candidates. There were tests of vision in existence, but there was a real need for these tests to be standardized. Otherwise a teacher trained in one area might be refused in another, an undesirable anomaly. Trained teachers should be freely interchangeable, as they would with a uniform standard, and this free movement engendered breadth of view and added experience.

Junior scholarships were awarded at the age of 11 years, and provided for five years at a secondary school. Senior scholarships were awarded at 16 years of age, and gave four years at a University. The training college was entered at the age of 16, and teachers were admitted to their work at 21.

TABLE OF STANDARDS  
(a) HYPERMETROPIA

Candidates	Age	Sphere	Cylinder	Spherocylinder
All	11-21	5 D.	4 D.	Average of four meridians = 5; As. not over 3 D., e. g., + 3.5 D. sph. c. + 3 D. cyl.

(b) MYOPIA, WITH MIXED ASTIGMATISM

	Age	Sph.	Cyl.	Sph.cyl.
Teacherships ...	21	5 D.	4 D.	As in hypermetropia
Senior scholars	16	4 D.	3 D.	Average of four meridians = 4. As. not over 3 D., e. g., - 3 D. sph. c. - 2 D. cyl.
Junior scholars	11	3 D.	3 D.	Average = 3 D., As. 2 D., e. g. - 2 D. sph. c. - 2 D. cyl.

Recently the author had adduced evidence of the disability due to defective vision in myopes. It was found in that investigation that myopes of 3 D. to 5 D., who were engaged in continuous close work, showed failure in work to the extent of 33%; those from 5 D. to 10 D. to the extent of 60%, and those over 10 D. to 77%. The whole of these myopes showed a failure of 53%; whereas myopes of the same order, who did not engage in continuous close work, failed only to the extent of 9.4%. On this basis, the author had worked out a table of standards, which he now submitted to the Section for consideration and discussion. Starting with the allowable margin of error in teachers at the age of 21, the difference was estimated for the children at the age of 11.

Mr. Harman had given consideration to a number of possible defects due to odd eyes, old inflammations resulting in scarred eyes, etc., also amblyopia from squint and defects of color vision.

Difficulty might sometimes arise in the disbaring of young myopes who were alleged by their teachers to be "brilliant," but these reports should not be considered too seriously. Myopes devoted an undue amount of time to close work, because the defect of sight presented a handicap in games; yet the all around candidate with better sight might be the better in the long run. The 2 D. difference between teacher and junior scholar in the allowable degree of myopia was none too much for ten years of hard study between the 11th and 21st years, which were also the most critical years of development. In such cases it was better, in the interests of both the candidates and the teaching service, to divert their energies to safer channels at an early age. There were now trade scholarships, entailing but little strain on the eyes.

*Discussion.*—Mr. ERNEST CLARKE agreed that lamentable mistakes had arisen thru various county authorities having different standards of vision and fitness for their candidates. It would be a difficult matter to devise a standard

of universal application; one child with more than 3 D. of myopia might be puny and narrow chested, with no liking for games, while another, with a like degree, might be robust and one who indulged in out of door games. Much must hinge on the previous personal history, and there should be records kept of each child, so that the examiner would know whether the myopia was progressive. It would be extraordinarily difficult to set a standard for hypermetropia; in those cases it was the small errors of astigmatism which would count, because those with the big errors would take care of themselves. Some people seemed to be born teachers, and it seemed a pity to exclude them from that profession. Much must depend upon supply and demand; if many candidates were available, the standard could be kept high, but if the converse were the case, it would have to be lowered.

Mr. INGLIS POLLOCK spoke of the methods in use at Glasgow. If a child was found to have increasing myopia, it was open for the examiner to admit him, but with the proviso that he could not participate in the superannuation scheme.

Mr. T. HARRISON BUTLER pleaded for discretion to be vested in the examiner. To express an opinion on a case of myopia in this connection, one should see the child for two years. Myopic children had a natural tendency towards learning, and he contended that progressive myopia had no connection with following near work. It would be undesirable to allow an unproved theory to influence legislation.

Dr. F. C. SHRUBSALL spoke from the standpoint of the school medical officer. He welcomed such a contribution as Mr. Harman's if it led to a general consensus of opinion, as sometimes the opinion given by the school medical officer was overridden by a letter from a specialist. Candidates should be told of their unsuitability before commencing the study, not after studying four years.

In the end, the subject was referred to the Council of British Ophthalmologists, with a request that they would try to devise a uniform standard.

## THE HOUSTON OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY.

October.

DR. HENRY C. HADEN presiding.

DR. C. P. HARRIS read a paper on **Roentgentological Considerations** for the eye, ear, nose and throat surgeons.

### Corneal Sequels of Trachoma.

DR. E. L. GOAR presented a man 25 years of age. The history is that of a chronic inflammatory condition of the eyes of several years duration. The lids were typical of a chronic, severe type of trachoma, with much scarring and distortion. Each cornea was thin and ectatic on the upper half, protruding forward to such an extent that the upper third was even with the apex. The temporal side bulged slightly more than the nasal. Each cornea was vascularized from every portion of the limbus, the attenuated vessels meeting in the center of the cornea. Vision fingers at 15 feet both eyes. Treatment has consisted in resection of both upper tarsi and instillation of powdered dionin for the past several months. Because of the irregular astigmatism and the marked vascularization of the cornea, no lens improves the vision. Dr. Goar remarked in discussing the case, that if it were possible to use a contact glass constantly in this case, the vision might be somewhat improved. As the keratectasia has not advanced in the past year, no operative interference is indicated at present.

### Iritis and Secondary Glaucoma.

DR. WM. LAPAT reported a case of subluxated lens. J. T., age 35 years; colored, injured August 2nd, 1922, by being struck in right eye by a truck handle. Patient was seen twelve days after injury, at which time there was much ciliary injection, much pain, cornea slightly hazy, pupil somewhat wide but irregular. The iris was muddy, and it appeared as if there was subluxation of the lens. Tension was 25 mm. Hg., and vision counting fingers at 10 feet. Gradually the cornea began to clear, and it was seen the lens had many small spots, such as are found after posterior synechia.

There was a gap between the outer border of the lens and the iris. The lens appeared to be notched, and the iris was slightly tremulous. It was difficult to make out whether it was a subluxated lens with a slight coloboma or a cyst of the iris, the edge of the lens being seen partly in the anterior chamber. The whole lens was clear except for iritic spots. The patient complained of much pain, tension was up to 70. Eserin did not relieve; iridectomy was done. Tension came down to 30, and vision at present 20/70.

### Iridocyclitis from Diseased Tonsils.

DR. E. M. ARNOLD reported on F. N. J., age 32 years, who came June 30th, complaining of pain in right eye, excessive tearing and sensitiveness to light. This condition had existed for three days. Vision was not much impaired. A diagnosis of iritis was made—the pupil was small, reacted slowly and responded poorly to atropin. Under atropin, mercury and hot applications the condition did not improve. The teeth were in good condition and the tonsils looked harmless and were not large, nevertheless, it was suggested that the tonsils be removed, and this was done on July 8th. Since the operation there has been no more pain, and the iritis cleared up promptly. Patient had been using atropin t.i.d. for several days, but the pupil was only partially dilated. But two days after the operation the pupil became widely dilated with no increase in the atropin.

E. M. ARNOLD,  
Secretary.

## CHICAGO OPHTHALMOLOGICAL SOCIETY.

October 16, 1922.

Vice-President, DR. FRANK BRAWLEY, in the Chair.

### Basal Cell Epithelioma of Lids.

DR. LOWRY (for Dr. George F. Suker) reported the case of a man, 46 years old, who six months ago had an ulceration of the upper lid of the right eye, which extended from the inner canthus to one-half inch beyond the outer

rim. Rodent ulcer of the eyelid was diagnosed. An exenteration of the orbit was performed to extirpate malignancy. Two pedunculated flaps were brought down from the forehead and attached to the normal conjunctiva. Cicatricial tissue had since made several outer canthotomies necessary. The patient had received some X-ray therapy since the operation. There was no limitation in the ocular movements, no diplopia or reduction in visual acuity; nor was there an involvement of the cornea.

#### **Cavernous Hemangioma of Ophthalmic Vein.**

DR. COTTLE (for Dr. George F. Suker) reported the case of a male baby, four weeks old, brought to the hospital 10 days after birth, with a markedly protruded right eye, which showed corneal abscess with threatened perforation. The equator of the eye was beyond the lid margins and pushed somewhat downward. The eye could not be replaced. There was no palpable pulsation, and no audible bruit. Above the eye could be felt a soft, compressible mass, which pushed the eye downward and outward. Because of the absolute loss of function, and potential danger to the other eye, the eye was enucleated.

The diagnosis was that of hemangioma, probably of the cavernous type. The tumor was still present, but had not increased in size since the time of operation. In this case there was a suspicion of a history of trauma. The child was delivered by a midwife. X-ray examination showed no evidence of fracture which might produce a laceration in the orbital region.

Examination of the eye and adnexa showed no evidence of extra- or intrabulbar tumor formation. The soft tissues about the optic nerve had the appearance of loose epibulbar tissue, soaked or infiltrated with blood. The central four-fifths of the expanse of the cornea had suffered what appeared to have been an incompletely perforating ulceration. The lens was in its normal position and what could be seen of the iris did not appear to have been displaced forward, as would be the case had the cornea been perforated.

#### **Nephritic Retinitis.**

DR. ROBERTSON (for Dr. George F. Suker) reported the case of a boy, 14 years old, who was admitted one week ago, complaining of periodic attacks of vomiting associated with headache. The attacks started about a year and a half ago, the interval between attacks becoming shorter and shorter, so that they now occurred every two or three days. There was no history of the disturbances of childhood.

The essential positive findings were a systolic pressure of 224, diastolic 170, giving a pulse pressure of 54. The urinalysis showed a large amount of albumin, and a specific gravity of 1011. The blood Wassermann reaction was negative.

Examination of the eyes showed R. V. 20/13; L. V. 20/13. Both disc surfaces were edematous, the margins distinctly blurred. The veins were engorged, the arteries small and there were numerous plaques of hyalin degeneration arranged around the macular region.

The diagnosis was made of chronic diffuse nephritis and nephritic retinitis. The case was interesting because of the extreme youth of the patient with such *high blood pressure* and the good vision present in the eyes.

#### **Chorioretinitis Pigmentosa.**

DR. FINK (for Dr. George F. Suker) presented a case of chorioretinitis pigmentosa.

#### **Pigment on Caruncle.**

DR. OLIVER TYDINGS presented a young lady, who showed a pigmented spot on the caruncle, which had existed for a year. Microscopic examination had not been attempted.

#### **Sarcoma of Orbit.**

DR. MICHAEL GOLDENBURG presented the case of a man, 42 years old. He first noticed a swelling the size of a pea over the left lacrimal sac one year ago, which disappeared after about six weeks, recurring two months later, and had gradually increased in size. The growth had been much more rapid during the past six or seven weeks. It had broken open at two points during the past week and was discharging slightly at present.

There was a reddish, angry swelling about two by three inches, which projected about an inch and a half. The eye was proptosed and pushed outward from the midline very markedly. Over the lacrimal area there were two smaller rounded swellings. To the temporal side of these swellings was a crevice where the skin was broken open. Temporally and 3/4 inch below this was a 3/8 inch opening in the skin which discharged a small amount of yellowish serous fluid. Large branching veins could be seen plainly under the skin surface. The right and left consensual reactions were good; the left eye reacted slightly to light; the left eye was blind except for light. Three weeks ago he could count fingers at 18 inches, to the nasal side.

**Fundus:** The disc could not be located. Many hemorrhages were present, retinal and subhyaloid. The vessels were tortuous. Many white areas were present. On the nasal side, it looked as if some detachment of the retina were taking place, with a possibility of a neoplasm breaking into the eyeball. The blood Wassermann reaction was negative.

The diagnosis was that of sarcoma, probably originating in the ethmoids.

**Discussion.** — DR. ELBERT CLARK stated: Radium was applied externally on July 18 for 4200 milligram hours, screened with 0.6 mm. gold, 1 mm. silver, and 1 1/2 cm. rubber. This application was changed every six hours for forty-eight hours. On July 25, 2712 milligram hours were used, five pieces of radium being embedded in different parts of the tumor, and so arranged as to be not over one centimeter apart. No other treatment had been employed. There was a rather violent reaction, with a little more swelling and edema.

#### **Industrial Efficiency with Poor Vision.**

DR. W. A. FISHER presented a man to show what could be done with 20/200 vision. He was 38 years old. At the age of 11, when in the fifth grade at school, he contracted smallpox. The left eye was removed by the late Dr. Beard, and he attempted to

restore vision by an iridectomy on the right eye. The patient was blind from the age of eleven until he was thirty. An iridectomy performed at that time gave him 20/200 vision. He then learned the brick laying trade, and for the last five years had been drawing full pay as a brick layer. The interesting thing was that he was now a useful man, drawing the same wages as though he had 20/20 vision. He would be classed as industrially blind on account of the 20/200 vision.

#### **Lens Extraction by Barraquer Technic.**

DR. W. A. FISHER presented a lady to show that the lens could be removed by the complete Barraquer technic, carried out as Barraquer was doing it at this time. He was not operating according to any paper that he had ever written. His latest paper, not yet published, would be something quite different. Barraquer in that paper would present 112 original pictures, giving his technic in full. In this case the technic was that which Barraquer used in Richmond and Philadelphia in April, 1922. All the patients were left with nice round pupils. In the first place, he dilated the pupil with eucaïn and cocain, using it every fifteen minutes for an hour and a half, or until the pupil was fully dilated. He then made an injection of novocain across under the lower lid, one downward and one upward. In every operation he turned the lens upside down, bringing the lower edge up first, and no pressure was used. The operation was done with a dilated pupil with a very small peripheral iridectomy, as in this case. In several cases the novocain produced a paralysis of the orbicularis, and stitches were put into the skin of the lids to keep the eye closed. The patient was in the hospital nine days, did not have any postoperative inflammation and had 20/20 vision.

#### **Mydriatics and Cycloplegics.**

DR. G. HENRY MUNDT read a paper on this subject, in which he stated that one of the very important works of the ophthalmologists was refraction, and a vast majority of competent men

considered a cycloplegic one of the prime essentials of good refraction. He considered the isomeric substances hyoscin hydrobromid and scopolamin hydrobromid identical, since Merck labeled them so; also this was a practical settlement of their difference which had been extensively discussed. He was thoroly convinced that in refraction every patient under forty years of age should have a cycloplegic; that nearly all those between forty and fifty should, excepting those who had normal vision and apparently did not need distance lenses; in other words, excepting only those presbyopes who needed reading lenses and had no symptoms other than poor vision for close work. Practically all patients under fifty years of age should be refracted with a cycloplegic. In myopia it was as essential to use a mydriatic as in any other class of cases. He could not subscribe to the view that hyperopia was the indication for refraction with a cycloplegic. If one was to determine with accuracy the total error of any patient, the one right method was to use a cycloplegic, and before any one was really competent to prescribe lenses, he should know the total error of refraction.

As to the comparative value of the three common cycloplegics, homatropin hydrobromid, hyoscin hydrobromid and atropin sulphat, for refraction up to the age of fifteen or sixteen years, homatropin hydrobromid was probably the poorest drug for use in these cases; because while its mydriatic action might be complete, the essayist thought it was a failure as a cycloplegic at this age. Atropin sulphat was probably the best drug when used properly, because of its certainty of action and its relatively low toxicity when compared with hyoscin hydrobromid. Hyoscin hydrobromid was a drug of first value; and in selected cases with proper precautions in its administration, it was very reliable, nearly as reliable as atropin sulphat.

As to the method of administering *homatropin* hydrobromid, he used a fresh solution (made fresh at least once a week) of 2 per cent. homatropin

hydrobromid and 1 per cent. cocain hydrochlorid. This was dropped in the conjunctival sac every five to ten minutes a varying number of times, dependent upon the age of the patient: from 15 to 20 years, 8 times; 20 to 30, 6 times; 30 to 40, 4 times; 40 to 50, 3 times, and beyond 50 once or twice only.

As to the use of *atropin* for refraction, a one per cent. aqueous solution was used four times a day for three or four days, in patients beyond six years of age; 3 to 6 years a one-half per cent. solution, and a weaker solution below three years of age.

The *hyoscin* hydrobromid was used in a solution, the maximum dose in adults being two drops of one-half per cent. solution, with the excess mopped up at once and pressure made over the sac. This meant that one drop might be used in each eye, or two drops with an interval in one eye. This was the maximum dose and must be used with great caution. He more frequently used a one-fourth per cent. solution, but in iritis the one-half per cent. solution was much more active. The one-fourth per cent. solution might be used twice with care as young as twelve years; from 12 to 8 about one-sixth or one-eighth per cent., from eight down, much weaker.

*Discussion.* — DR. OLIVER TYDINGS fully concurred in the opinion that hyoscin and scopolamin were the most important of the cycloplegics. He did not agree with the essayist as to the strength of scopolamin he used. Dr. Mundt spoke of a  $\frac{1}{2}$  of 1 per cent., Dr. Tydings used it in about  $\frac{1}{5}$  of 1 per cent. He did not hesitate to send a patient out with scopolamin any more than with atropin. He did not believe that in the last fifteen to twenty years he had used atropin in one case out of a hundred. The cycloplegic action that was obtained from scopolamin, in one-half or three-fourths hour, could only be obtained from atropin in three days, or sometimes longer.

He did not agree with Dr. Mundt when he advised atropin or scopolamin as a cycloplegic in all cases. He thought one could refract many cases without any cycloplegic at all.

DR. THOMAS FAITH referred to two points not mentioned in connection with homatropin and scopolamin. One was that much of the homatropin had been very faulty for a year or so. There had been many instances in which the effects had lasted for days. A peculiar thing he had noticed in connection with homatropin was that frequently he could get 1/2 to 1/4 more plus sphere without homatropin, than he could get with it.

Another thing in connection with the use of scopolamin was, that he had used it in a strength of one grain to the ounce and found it deteriorated very rapidly. In a very short time scopolamin would not be of any value, even at the end of a week sometimes. He had not used 1/2 of 1 per cent. of scopolamin, but always had adhered to the weaker solutions. He had given scopolamin to use at home, giving them 1/4 grain to the half ounce, and had it applied once or twice a day for several days, and then followed with two or three instillations of scopolamin in the office, usually two, at one sitting with a 15 to 20 minute interval. The advantage of this was, that instead of having two weeks mydriasis he had two or three days. There was a tendency to get away from homatropin and scopolamin and all cycloplegics, but he felt that the refraction was not as good when done without them. He prefers all his patients to use homatropin or scopolamin up to forty; after that he used homatropin occasionally, but not as a rule. He did not rely on homatropin as he did a few years ago, but he did use scopolamin right along.

DR. MUNDT. As to the strength of hyoscin, the maximum was 1/2 of 1 per cent. He said he more frequently used 1/4 of 1 per cent. but one could

use 1/2 of 1 per cent., and it was very active. He did not prescribe it as a cycloplegic, because he thought it was too active to put into the hands of a patient. He thought scopolamin was about like putting a can of ether in the hands of a patient.

As to the activity of hyoscin, there were three isomeric substances. One diverted light to the right, one to the left, and one was nonlightdiverting. The nonlightdiverting was absolutely nondilating. He thought there was no question that homatropin was not constant.

#### Results of Col. Smith's Cataract Operations.

DR. W. A. FISHER read a paper correcting earlier reports (See Feb. No.), which will be published in full in this journal.

*Discussion.* — DR. THOMAS FAITH stated that the intracapsular operation must stand on its own merits, and it should be given this opportunity. At the December meeting he made the statement that he could not understand the great difference in the results at the Illinois Charitable Eye and Ear Infirmary and the Chicago Eye, Ear, Nose and Throat Hospital, because he had watched the Smith method for several years, and the freedom from postoperative inflammation was striking, and had been well set forth by Smith in his various writings.

He saw the four cases mentioned by Dr. Fisher and was able to obtain 20/20 vision without any difficulty in three, but the fourth being a fundus lesion could not be expected to have normal vision. However, the surgical result in this case was excellent.

ROBERT VON DER HEYDT,  
Corresponding Secretary.

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## GRADUATE TEACHING IN OPHTHALMOLOGY.

### The Ernst Fuchs' Society.

The second annual meeting of this society will be held in New Orleans, January 24th to February 9th. The Grunewald Hotel will be the headquarters and meeting place. The class is limited to one hundred. The Course will include intensive graduate instruction in both ophthalmology and otolaryngology. Application for detailed information and enrollment should be made to the Secretary, Dr. Sidney Israel, 403 Carter Building, Houston, Texas.

The instructors secured for this course include:

Dr. Arnold Knapp, New York City.  
Dr. George E. Shambaugh, Chicago.  
Dr. L. W. Dean, Iowa City.  
Dr. Edward Jackson, Denver.  
Dr. Marcus Feingold, New Orleans.  
Dr. R. C. Lynch, New Orleans.

Also the Professors of Anatomy, Physiology and Pathology of Tulane University.

### Teaching of Ophthalmology in Paris.

#### CLINICAL WORK.

During the winter semester, 1922-23, clinical instruction is given by:

DR. DUPUY-DUTEMPS at the Hospital Saint-Antoine. Examination of patients Monday, Wednesday and Thursday.

At the Foundation Rothschild, Operations, Thursday and Friday.

DR. V. MORAX at the Hospital Lariboisière, Monday, Friday, Saturday, Examination and Discussion of Cases. Tuesday and Thursday, Operations.

DR. DEMICHERI, on Wednesdays, gives, at the same place, a course on the External Diseases of the Eye, in Spanish.

DR. POULARD at the Hospital Necker (children), Monday and Thursday, Examination of Patients. Wednesday and Friday, Operations. Tuesday, Conference.

DR. ROCHON-DUVIGNEAUD at the Hospital Laennec, Tuesday and Thursday, Ophthalmic Diagnosis; Wednesday, Operations, and on Monday, Operations, at the Foundation Rothschild.

#### SPECIAL COURSES.

*Practical Ophthalmoscopy.*—This is given in the service of DR. V. MORAX at the Hospital Lariboisière and includes ten conferences; with practical exercises by DR. BOLLACK.

*Ocular Surgery.*—Given by DR. POULARD at the Children's Hospital and includes five lessons.

*Practical Ophthalmology.*—Given by DR. POULARD at the same place, and includes eight lessons, given on Monday, Wednesday and Friday.

*Ocular Histopathology.* DOCTORS MAGITOT and DAUTREVAUX give this course of twelve lessons, at the Hospital Lariboisière, in March. It deals with technic and laboratory work.

*Ocular Bacteriology.*—A course of eleven lessons in technic with practical exercises will be given by DOCTORS MORAX and BOLLACK at the Hospital Lariboisière on Monday, Wednesday and Friday beginning April 11th, 1923.

*Ocular Physiopathology.*—A series of 12 lessons on this subject will be given at the Hospital Lariboisière by DOCTORS MAGITOT and BAILLIART.

*Binocular Vision and Strabismus.*—In the service of DR. DUPUY-DUTEMPS, a series of 9 lessons will be given by DR. JOSEPH in May, 1923.

*Ocular Neurology.*—DR. DUPUY-DUTEMPS will give ten lectures Monday, Wednesday and Friday, beginning May 19th, 1923; and

*Ocular Surgery.*—The subject of five lessons in May at the Hospital for Children.

*Practical Ophthalmology.*—At the above Hospital, DR. POULARD will give 6 lessons Monday, Wednesday and Friday in June.

*Neurology of Eye.*—In the service of DR. MORAX at the Hospital Lariboisière ten lessons will be given in English by DR. E. HARTMANN, in June.

*Physiopathology of Eye.*—At the Lariboisière Hospital ten lessons will be given by DR. A. MAGITOT in June.

*Operative Technic.*—At the Amphitheatre of Anatomy, under direction of PROFESSOR SEBILEAU, a course will be given by DRS. MORAX, MAGITOT and BOLLACK.

# American Journal of Ophthalmology

Series 3, Vol. 6, No. 1

January, 1923

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

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Proof should be corrected, and returned within forty-eight hours to the printers. Reprints may be obtained from the printers, Tucker-Kenworthy Co., 501 S. La Salle St., Chicago, Ill., if ordered at the time proofs are returned. But reprints to contain colored plates must be ordered when the article is accepted.

Copy of advertisements must be sent to the Manager by the fifteenth of the month preceding its appearance.

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JEAN MATTESON, Room 1209, 7 West Madison Street, Chicago, Ill.

## MAGNESIUM SULPHAT FOR GONORRHEAL OPHTHALMIA.

The bactericidal treatment for conjunctival inflammations has always been supplemented by cleansing solutions that were supposed to remove the bacteria, and the material that would serve as a nidus for their multiplication. When it was found that argyrol showed very little bactericidal power under the conditions present in the conjunctival sac, those who had clinically observed its beneficial influence fell back on the explanation that it drained the tissues of lymph, which inhibited the growth of the bacteria, and washed them out of the deeper tissues where they were quite out of reach of antiseptics.

The world war, thru the enormous number of infected wounds, thrust the question of the most effective treatment of infections to the front. The application of germicides of greatest efficiency gradually gave place to the use of solutions that were either chosen without reference to any germicidal power, simply because they were hypertonic; or to those like the hyperchlorit solutions, that might be sup-

posed to act at least as much by carrying away bacteria, as by killing them.

As the good results following the use of hypertonic solutions, as explained by Wright, thru their drawing thru the injured and infected tissues lymph capable of combating the infecting germs, Kirkpatrick at Madras began to apply hypertonic solution of magnesium sulphat to the treatment of inflammatory conditions of the conjunctiva and surface of the cornea. After four years experience, he reported in 1920 his favorable experience with this method in corneal ulcers, and especially in gonorrheal ophthalmia. No eye in fair condition when the treatment was begun was lost.

His method was thus described: "The strength of the solution used varies from 40 grains to the ounce to saturation, and this is applied in an eye bath for five minutes every two or three hours; in addition, the conjunctival sac is thoroly irrigated by the surgeon once a day or oftener. In cases of gonorrheal ophthalmia, both urotropin and stock gonococcal vaccines are given as well."

It is interesting to learn from the last report of the Government Ophthalmic Hospital at Madras (for the year 1921) that this method has been continued for all cases of the class with continued good results. The report states: "Forty cases in all, adults and children, were treated by irrigation with saturated Mag. Sulph. Solution, as described by Kirkpatrick (Brt. Journal of Oph., June, 1920), with slight modifications. The treatment is carried out in the following manner. An assistant flushes the conjunctival sac several times a day with the solution put up in 2-lb. bottles fitted with cork and glass rods after the manner of the familiar laboratory wash bottle. Adult patients, in addition, use the solution repeatedly thruout the day (at least 5 minutes in every 2 hours) in the eggcup shaped eye douche. Between the irrigations,  $\text{AgNO}_3$ , grs. 3 to the oz., is instilled 2 or 3 times a day. Very satisfactory results were obtained. There were only 2 failures, but these two came to the hospital with ulceration of both corneae, and even one of these left with useful vision in one eye after trephining had been done as a safeguard against subsequent rise of tension."

Such results from the treatment of gonorrheal ophthalmia are exceptionally good. Then as compared with argyrol, magnesium sulphat possesses certain advantages as the basis for a hypertonic solution. It is cheaper, free from any risk of staining, and the solutions are very easily prepared and stable. Then the fact that it is everywhere obtainable adds much to its practical usefulness in some locations. It is a method of treatment that should be more generally tried, and the results of others with it reported to the profession.

E. J.

#### GRADUATE TEACHING OF OPHTHALMOLOGY.

The article on this subject, published on page 33 reviews the needs for such teaching, from a point of view that has been approached or reached by most teachers who have considered

it. The old belief that there was no place for specialization in medicine, except such as individuals might work out with their own personal desires and opportunities—no specialization to be recognized in the general educational scheme of the medical profession—has faded away with the enormous expansions of medical knowledge and achievement that have come in the last half century.

Rightly, there are specialties in medicine. It is now respectable and even creditable to confine your professional work to one of them. They now offer the most direct and certain path to distinction and financial success. One who has devoted himself to ophthalmology from his earliest years of practice, is now President of the American Medical Association. Surely, it is quite time that the teaching of ophthalmology, as a specialty, the adequate preparation of men and women to recognize every condition affecting vision, or the eye and the organs immediately accessory to it, should claim the attention of all medical educators.

Another fact is being recognized in all branches of education. No man, who can be called well educated, in the modern sense, has become so by going to school until he grew up, or was 20 or 25 years old, then ceasing to study. That process always left him partly developed, and could not possibly store his mind with the mass of known facts bearing on any science, or art; a mass that is continually growing by new studies and observations, that are being reported in special journals, and monographs continually flowing from the printing press.

An habitual reader can accumulate statements of facts, but reading alone does not give a complete professional education. The laboratory, the clinic and the contact with the thought of teachers are essential; and opportunities of this kind, it is a duty of educational institutions to provide; as much for the graduate as for the undergraduate. Such provision is essential not only to bring the general practitioners and specialists of today to the highest

efficiency, and place at their command the latest advances in knowledge and armamentarium; equally, it is needed for the future, as one essential part of our permanent educational facilities; to furnish at all times a high grade of training for the physician or specialist, and to develop completely his ability to serve the community.

But specialization of medical practice is only possible, where the concentration of the population and the development of means of rapid communication make the services of the different specialists available to enough patients to furnish all of them with a living. There are still thinly peopled regions and isolated communities, that cannot support more than one doctor. All the help they can expect from modern medicine and surgery must come thru him. The truly general practitioners should still form a large part of the profession. Even without the influence of tradition, that makes men follow in the footsteps of their fathers, this will continue to be the case until means of communication and social organization have reached a much higher development.

To furnish the general practitioner the acquaintance with ophthalmic diagnosis and therapy, that he can apply, in a way that will serve his patients better than they can be served by anyone else, is a very important function of graduate teaching in ophthalmology. For one this may be some special training as to the use of the trial case and prescription of lenses, for another a better acquaintance with industrial injuries and the removal of foreign bodies, for a third a practical acquaintance with trachoma or ophthalmia neonatorum, for still another preparation to examine the eyes of school children. Possibly all these needs will arise at different times for the same general practitioner. The medical schools should stand ready to meet them with short intensive courses, that will conform to the requirement of the greatest economy of time of the busy practitioner, whose absence from his work must be brief

if he is to have such opportunities at all.

The ophthalmologist established in active practice may also find it extremely difficult to leave his work for any extended course of graduate study, no matter how alert he may be to the advantages of new methods of examination or treatment, or how keenly he may feel the defects in certain respects of his early training. The need of short intensive courses arranged with the purpose of the greatest economy of the student's time is felt by the ophthalmologist as well as the general practitioner of medicine; and it will continue to be a real and important need, after every one entering upon ophthalmic practice has had, at the outset, his year or more of special training, such as is now being given in a very few university medical departments. E. J.

#### ASSOCIATIONS FOR GRADUATE STUDY OF OPHTHALMOLOGY.

To induce the universities to establish special courses for the graduate teaching of ophthalmology, even on the usual basis for courses leading to higher degrees, or as fellowships that should give assistance in the teaching of undergraduates, has been no easy task. This might be guessed from the few institutions that have actually afforded such opportunities. But it is only fully appreciated by the few that have overcome the inertia of Medical Faculties and Deans, University Presidents and Trustees and the almost insurmountable obstacles to getting an adequate corps of instructors to fully occupy the graduate student's time. This has been done for the students who could come to the universities for one or more years of formal study; but for many already established in practice, any such break in their life work seems impossible.

More has been done for the latter class, in the direction of the graduate study they need, by the societies devoted to ophthalmology. The local societies in their exhibition and discus-

sion of cases, instruments and methods, are not very different from mutual quiz classes. Even the national gatherings furnish more of intellectual contact and discussion over ordinary cases and methods, than of papers setting forth new facts in ophthalmology; and very frequently, there have been demonstrations and clinics held in connection with their annual meetings, such as would add to the value of any graduate course of teaching.

In 1921, the American Academy of Ophthalmology and Oto-Laryngology arranged a graduate course lasting 3 days, after its annual meeting. A class of almost 500 gathered to sit hour after hour in close attention to those who took part in the crowded program. A year later the second course was given with equal success. In 1922, the American Ophthalmological Society arranged a series of expositions of remarkable microscopic slides, avowedly as an experiment to be followed by more extensive programs along related lines. The interest of the Washington Congress reached a high point in the demonstrations given by Gullstrand, Collins, Nordenson, Magitot, Balbuena, and a dozen others, which represented graduate teaching at its best.

But perhaps the most important development in this direction was the formation of the Ernst Fuchs Society, during the course of lectures given by Professor Fuchs at Houston, Texas, last year, and which meets for a half month of graduate study in New Orleans, January 24. That properly presented opportunities of this kind could be made popular, has been demonstrated by the interest in the lectures of Fuchs, Lindner and Bárány; and the great unwieldy crowds that flock each year to the Clinical Congress of Surgeons.

The plan of the Fuchs Society for a two weeks of intensive graduate study of ophthalmology and otolaryngology each winter, seems to be a very practical one. The period is not too long for busy practitioners to be away from their patients each year, but it is long enough to get a good deal of help from a group of earnest ex-

perienced teachers who have no obstacle of language to overcome and are in close touch with all the problems of daily ophthalmic practice. We predict that an annual course of this kind will soon be looked forward to and enjoyed by most active American Ophthalmologists. If it has been sufficiently advertised, the class of one hundred provided for at New Orleans will be filled to the limit. A series of such courses will do more to rapidly raise the standard of educational attainment among those engaged in ophthalmic practice than any other plan that has yet been put in operation.

E. J.

### OPENINGS IN OPHTHALMIC PRACTICE

The scarcity of well trained young men and women to give needed service in ophthalmic practice, and in return to receive an attractive income from the very beginning of their professional careers, is well known to those who have much to do with the training of them for ophthalmology as a specialty. At the close of the world war, there was rather a large number of fairly trained young men with some experience, looking for locations in the United States, in which to engage in ophthalmic practice. But these were rapidly absorbed by communities and positions that had really needed them.

Every medical and surgical "group" formed in the last few years, has desired the help of a specialist, usually expected to cover the eye, ear, nose and throat, and to take responsibility for it. Many of these groups have had great difficulty in getting the kind of help they wanted, and have been forced to take some one who had been inadequately trained for it, or who was quite lacking in experience. We know of one such group that was offering \$6,000 a year for a young man to take this position with them. Every year several applications come to the Editors of this Journal for assistants ready to really assist in the private offices of ophthalmologists of established practice and high skill.

In our advertising pages this month is a very attractive offer for an office assistant, from a man very widely known in America, and in other countries, as an able writer and practitioner of ophthalmology. We have also before us an appeal from another specialist in a small city, for some one to take his work while he is seeking to regain health, with a prospect of becoming a partner if the relation seems mutually advantageous. The attempt of the JOURNAL to bring together busy men who wanted help and younger men who needed the opportunity, has failed usually, because there were so few of the latter. It would be a real service to young graduates in medicine, to ophthalmologists in active practice, and to the communities at large if attention were generally directed to training of those seeking success in life thru careful preparation for ophthalmic practice. The young man who too quickly acquires a large practice of his own, is in great danger of going thru life with superficial and loose methods of observation and thought, because he never has had time to concentrate sufficiently on the cases that come before him. This danger is avoided by beginning to practice under the guidance of an experienced and thoro worker in the field of ophthalmic practice.

E. J.

#### BOOK NOTICES.

**Ophthalmoscopy, Retinoscopy and Refraction.** W. A. Fisher, M.D., F. A.C.S., Professor of Ophthalmology in the Chicago Eye, Ear, Nose and Throat College. 12 mo., 232 pages, 200 illustrations, 24 colored plates, Chicago, W. A. Fisher, M.D.

This is a practical book, by a practical teacher of ophthalmology. After many years of experience in teaching, it has been written to meet the practical needs of students as they have come, often many years after graduation in medicine, desiring to study ophthalmology in preparation for special practice. Ophthalmoscopy is the basis of modern ophthalmology, and Dr.

Fisher finds it is "not taught either practically or successfully in medical colleges."

This book has been written to teach medical practitioners and students the practical use of the ophthalmoscope and retinoscope. The colored plates show various conditions of the fundus. A duplicate set of them is furnished on an insert sheet, for use with the schematic eye; which the author describes and advises the reader to use, in getting his practical acquaintance with the ophthalmoscope.

This book contains more than its title might imply, as may be seen by a glance at its table of contents, set forth in chapter headings. Ophthalmoscopy (including account of the schematic eye), Diseases of the Retina; Diseases of the Choroid; Diseases of the Optic Nerve; Field of Vision; Indirect and Direct Ophthalmoscopy; Systematic Examination of Eye; Glaucoma; Optical Principles, Test Type, Lenses, Refraction, and Cycloplegics; Applied Refraction, Astigmatism, Presbyopia; Heterophoria—Muscular Insufficiency; Retinoscopy, Measurements of Lenses, Prescription Writing, Transposition, and Frame Fitting.

Brevity and clearness of statement mark every page of the work; the sentences have the dogmatic character so effective in teaching. The illustrations are well chosen and mostly very helpful. The colored plates represent the ocular fundus better than those found in many other books intended for the student, and each is accompanied by an adequate explanation emphasizing the important features of the picture.

There is much justification for the following claim, if the emphasis is properly placed as we have indicated by italics: "*By mastering the methods here described and equipping himself with the necessary instruments, there is no reason why the general practitioner should not prescribe so as to correct the common errors of refraction, and become proficient in the use of the ophthalmoscope.*"

Teachers of ophthalmology can use this book and find it distinctly useful in

their work. The isolated student will find it one of the best with which to begin his preparation for a course of graduate study.

E. J.

**An International Congress of Ophthalmology**, Washington, D. C., April 25-28, 1922. Octavo, 714 pages. 136 illustrations. Edited by the Committee on Publication, Drs. William Zentmayer, chairman, Arnold Knapp, William E. Sweet, and Luther C. Peter.

This volume contains what was printed in the pre-session volume of the Congress and about 40 per cent more matter, including: The four addresses delivered before the Congress at its evening sessions, 73 pages; the discussions on papers read before the Congress, 72 pages; minutes, descriptions of exhibits, lists of members, committees, indexes, etc., 53 pages. It is beautifully printed on paper that allowed inclusion of everything in a single volume without making it unwieldy. The Committee on Publication are to be congratulated on the very efficient manner in which the arduous task has been performed.

From the lists we find the number of members of the Congress was 1210, of whom 579 registered their attendance at the meeting. The members from outside the United States numbered 125, of whom 51 representing 16 different countries attended. The Congress was the largest international congress of ophthalmology thus far held, and the foreign members outnumbered all the members of the only other international congress held in this country. This volume gives it an assured permanent standing among such congresses by the high scientific value of the proceedings it here records. We believe it will be accorded full standing as one of the series of international congresses, interrupted by the failure of the Congress to meet in Petrograd in August, 1914.

To anyone who does not receive this volume as a member of the Congress, we offer the advice, get it if you can from the Secretary, Dr. L. C. Peter of Philadelphia, or keep on the lookout for it when a copy is offered for sale. It will

be needed in any ophthalmic or medical library. It is chiefly published in English, there being but 105 pages in French and 107 pages in Spanish.

E. J.

**The Writing of Medical Papers**. Maud H. Mellish, Editor of the Mayo Clinic Publications. Philadelphia and London. W. B. Saunders & Company, 1922.

It is remarked that the business of societies is done by a select few, that the speakers in local, general, and national meetings are mostly the same from year to year, with the occasional addition of new blood replacing those who from death, disability or disinclination are not in attendance.

The writing of medical articles and books follows the same rule. New authors generally do not possess the know-how, the *savoir faire*, to compete in public places or in the press with the old guard until they have had years of practice. But despite their experience, the speaking and writing of these older appointed teachers is often a disappointment, particularly as to their command of the English language, which specially shows in the stenographic reports of their remarks.

There is book English—grammatical and clear—in which all the English speaking peoples agree—business and professional language which is likewise nearly in accord, and colloquial speech, which is so different that English, as spoken in Great Britain, differs so radically from the American speech as to be at least hard to listen to. So many of our scientific authors carry this idiomatic tendency into their writings, together with a want of conception of the proper uses of the written and spoken word. If we medical men only had an education in speaking and in writing to correspond with our technical knowledge, such criticism would not be necessary.

This little book by Maud H. Mellish, editor of the Mayo Clinic Publications, is something that has long been wanted. The writer personally wishes he had had some such guide when he first began writing, for then his own essays would not have been so subject to criticism, and

some of them would not have been written at all.

The book will certainly help untrained and partly trained writers to prepare for publication articles that will convey information with brevity, accuracy and clearness, and adhere to the accepted forms of present day usage. It takes up the subjects of good usage, the vocabulary, abbreviations, punctuation, grammatical notes, don'ts, subject matter; length of papers, arrangement; beginning and end, the outline, construction, the spoken address, case histories; abstracts, chapter, paragraph, and sentence, references, revision, the title, the manuscript, the proof bibliography and a full list of medical journals with their abbreviations, also a complete index. At the end of each short chapter are a few brief rules. That following "Subject Matter; Length of Papers," for example is:

"Avoid miscellaneous topics. Choose a subject, (1) of which original study has been made, and (2) on which further investigations may be made. Give a brief summary of personal observations on the topic previously published. Review literature briefly. Make papers brief and clear. Present to an audience only abstracts of long papers. Publish long papers serially."

The book is most highly recommended to all physicians, for we, all of us, at one time or another, have occasion to speak before societies or publish addresses and all are in a position to make certain additions to the science or the practice of medicine.

H. V. W.

#### BIOGRAPHIC SKETCHES.

THOS. HALL SHASTID, M.D.

SUPERIOR, WISCONSIN.

GEORGE MILBRY GOULD.—The world of ophthalmology was shocked and grieved to learn of the sudden death, on August 8, of Dr. George M. Gould, a strong, aggressive, and even unique figure in American medicine. The years will come and the years will go, but we never shall quite behold again a George M. Gould. A man of lofty principles, wide and varied learning, a white-hot zeal, unflagging energy, and a warm and

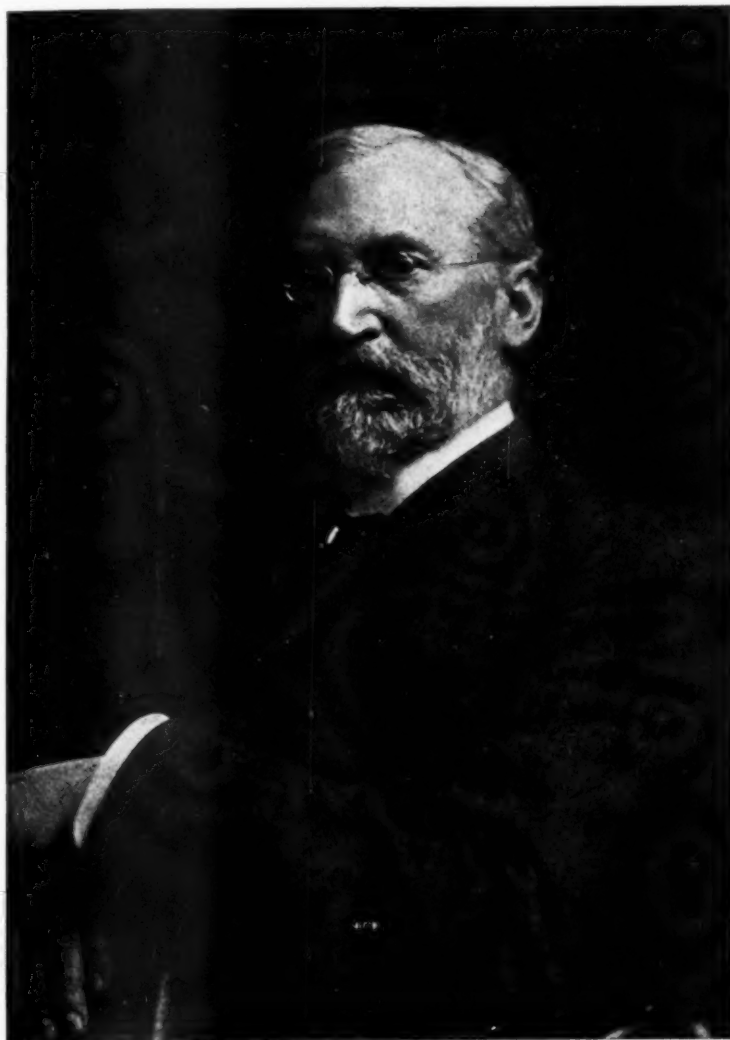
constant heart, he devoted himself to truth and friendship, the two greatest objectives in any human life. With deep sorrow, therefore, the following sketch is written. May it serve, at least to some degree, in perpetuating the memory of this remarkable man

George M. Gould was born at Auburn, Maine, Nov. 8, 1848, his parents being George Thomas and Eliza A. (Lapham) Gould. A remote ancestor was a Robert Gould (not Gould) who, in 1663, emigrated to Hull, Mass., from Somerset, England. In his early childhood, his own mother having died, George removed with his father and stepmother to Salina, Ohio. Here, and at Athens, O., he studied in public and private schools. At the age of twelve, however, he enlisted in the Northern army of the Civil War as a drummer boy, serving in that capacity from 1861 to 1862. Later he re-enlisted, this time as volunteer, and then served from 1864 to 1865. He received the A.B. at Ohio Wesleyan University in 1873, the A.M. (hon.) in 1892. In 1873 he attended a course at the Harvard Divinity School, but preached for the Unitarian Church only a few months; then spent several years studying in Europe. About 1876 he opened a book and fine arts store in Chillicothe, O., and continued in that and other business enterprises until he entered the Jefferson Medical College, Philadelphia. From that institution he received the degree in 1888, being president of his class. He at no time practiced general medicine, but at once, after graduation, opened an office in Philadelphia as ophthalmologist. In 1908 he removed to Ithaca, N. Y. There he practiced for a number of years, removing in 1911 to Atlantic City, N. J., where he remained and practiced until his death.

Dr. Gould was ophthalmologist to the Philadelphia Almshouse, 1892-94. He was editor of the Medical News, 1891-95; of the Philadelphia Medical Journal, 1898-1900; of American Medicine (which he founded) 1901-06. As a medical editor he inaugurated striking innovations. He was a Fellow of the College of Physicians, Philadelphia; a member of the American Ophthalmological Society and of the American Academy

of Medicine. Of the latter institution he was president in 1895. He was also a member of the Phi Beta Kappa and a speaker at the Congress of Arts and Sciences, St. Louis Exposition, in 1904.

tremely varied and highly important. In collaboration he wrote: "Compend of Diseases of the Eye" (1886-88); "Diseases of the Eye" (1897); "Encyclopedia of Medicine and Surgery" (1900-



George Milbry Gould, 1848-1922

In 1917 he received the first Doyné medal at the Ophthalmological Congress, Oxford, England. He was proffered the editorship of the Journal of the American Medical Association, also that of the British Medical Journal, but these appointments he declined.

Dr. Gould's literary activities were ex-

13); "Anomalies and Curiosities of Medicine" (1901); "Life and Letters of Edmund Clarence Stedman" (2 vols., 1910); "Genius and Other Essays, by E. C. Stedman" (1911). By himself he wrote or compiled: "Student's Medical Dictionary" (1890, 11th Edition 1900); "New Medical Dictionary" (10 editions,

1891-1900); "Pocket Medical Dictionary" (1892-1913); "Illustrated Dictionary of Medicine, Biology and the Allied Sciences" (1894-1913, with supplement, 1905); "Dictionary of New Medical Terms" (1894); "The Practitioner's Medical Dictionary" (1906-17); "American Year Book of Medicine and Surgery" (1896-1903); "The Meaning and the Method of Life" (1893); "Borderland Studies" (2 vols., 1896-1905); "An Autumn Singer" (poems, 1897); "Suggestions to Medical Writers" (1900); "Biographic Clinics" (6 vols., 1903-9); "History of Jefferson Medical College" (2 vols., 1904); "Concerning Lafcadio Hearn" (1908); "Righthandedness and Lefthandedness" (1908); "The Infinite Presence" (1910); "Personal Bibliography, of nearly 500 titles" etc., (1910). Most of Dr. Gould's writings, whether composed individually or in collaboration, received so wide a circulation that they need no description here. For example, over half a million copies were sold of his medical dictionaries alone.

Dr. Gould's interests, as may easily have been inferred from the bibliography above, were not by any means confined to ophthalmology or even to medicine. Thus, he investigated a multitude of such questions as, Why the Sap Rises in Plants and Trees; How the Erosion of Shore Lines can be Prevented; What are the Reasons for the Composition and Shapes of Shells and Pebbles. Questions in theology and general literature also strongly appealed to him, and he wrote upon these subjects much that was, and still is, widely read.

Dr. Gould was tall and well built, being 6 feet 3 inches high and athletic. He was of medium stoutness, of blonde complexion and with hazel eyes and gray hair. He was brilliantly alive when talking, otherwise deeply meditative. His scholarly recreations were general science, poetry, philosophy, music and art. He was a collector of natural history specimens, of objects of fine art, and of books. He was fond of children and animals, and had many pet horses, dogs, and birds. Familiar figures, of recent years, on the Boardwalk and the Beach at Atlantic City, were the Doctor

and his wife, together with their beloved collie, Douglas. Rain or shine, the promenade was daily taken. Another recreation of Dr. Gould's was lying at full length on the floor beside his collie, while he listened to music played or sung by friends. Dr. Gould was deeply, if broadly, religious, his views being exemplified in his "Meaning and Method of Life" and "The Infinite Presence." The ideas expressed in these books were many years later adopted (or independently invented) by Mr. H. G. Wells, and expressed in his "Mr. Britling Sees it Through."

George M. Gould, from early childhood, suffered severely from eyestrain and its reflexes. Doctor after doctor was consulted, but without relief. He even went so far as to consult a number of eminent ophthalmologists in Europe, but without result. The Doctor-Gould-to-be then vowed that, one day, he would himself become an oculist, and would then proceed to relieve his own eyes. This was prevented by various circumstances from studying medicine till far along in the thirties, he nevertheless eventually verified his own prediction. Relieved from the terrible handicap of eyestrain, he then rapidly developed into the brilliant Dr. Gould whom all the world knew. Moreover, because of his own personal experience with the affliction, he was enabled to relieve the sufferings of thousands of other persons, who, else, had gone unrelieved.

His greatest contribution, no doubt, to the science of ophthalmology was the all important and now almost universally admitted truth, that the tiniest possible error of refraction is sometimes the source of the greatest possible eyestrain, with its devastating nervous reflexes. And he emphasized the need of almost infinite patience in seeking out and discovering these minute, but highly significant errors. To impress upon the public conscience the full importance of small refractive errors, Dr. Gould wrote the series of books above referred to, entitled "Biographic Clinics." In these six volumes he analyses and convincingly traces the ill health of many famous people to eyestrain. Dr. Gould was somewhat violent, no doubt, in the

advocacy of his views, but his violence was probably justified. The attention of ophthalmologists was at all events aroused, and the human race is richer in comfort and good health today because of the great aggressiveness of Dr. Gould.

A matter once of much importance, now nearly forgotten, was the invention by Dr. Gould of cement bifocal spectacles. The original bifocal, invented by Benjamin Franklin, consisted of two distinct pieces, an upper and a lower, set edge to edge—the kind which later was known as the "split" bifocal. Dr. Gould's device was a distinct improvement over the old form. He originated also a number of devices for ocular examination, special lenses, trial frame, method of lighting, etc.

Dr. Gould married, on October 15, 1876, Harriet Fletcher Cartwright, daughter of the Hon. John Cartwright, of Pomeroy, Ohio; and on October 3, 1917, Laura Stedman, granddaughter of the famous banker-poet, Edmund Clarence Stedman. No children were born to either marriage.

Dr. Gould was seriously sick for only a few hours. He died at his home, No. 215 Atlantic Ave., Atlantic City, N. J., on the afternoon of August 8, of heart failure. Ten days before, the pet collie, Douglas, had died. For fourteen years this dog had been a constant companion to his master, and Dr. Gould had its body placed in a coffin, and buried in the Hartsdale (New York) Canine Cemetery. The loss of the pet had saddened and depressed the Doctor greatly, and may, in some degree, have contributed to his own decease.

Dr. George M. Gould has passed away, and, in his passing, the medical profession of America and of all the world has lost one of its greatest ophthalmologists, the human race one of its most entertaining and useful writers and kindest hearted men.

CHARLES WILLIAM TANGEMAN, a noted oculist of Cincinnati, died on April

2, after an extended illness. He was born at Mansfield, Ohio, March 9, 1856, a son of William and Margaret Tangeman. Obtaining his early education in the public schools, he received the medical degree at Miami Medical College in 1879.

Dr. Tangeman at no time practiced general medicine, but, shortly after graduation, became associated with Dr. W. W. Seely in eye and ear practice. Soon, however, he began to practice independently, and, from that time, restricted his practice to the eye. He became clinical professor of ophthalmology at the Ohio Medical College, and for more than twenty years was ophthalmologist to Christ's Hospital and to the Betts Street Hospital.

For a long time he was chief oculist to the Big Four Railroad. While engaged in the latter work, he is said to have "initiated and standardized the visual tests and qualifications for railway employes, which now are in common practice on all roads thruout the country." He was a member of the Cincinnati Academy of Medicine, the Ohio and American medical Associations, and the American Academy of Ophthalmology and Otolaryngology. In 1918 he became Professor Emeritus at the Ohio Medical.

Dr. Tangeman was large, well built, over 6 feet high and weighing 185 pounds. He had a light complexion, but well colored, gray-blue eyes and sandy hair. He wore, as a rule, a Van Dyke beard. He was bright, brisk and good humored, yet withal dignified. He was specially fond of poetry and art. His chief hobbies were oriental rugs, etchings and gardening.

Dr. Tangeman, in January of this year, went to California in search of health, but without avail. Late in March he returned to his home, where, soon after, he died. He was survived by his widow, also by a daughter, Miss Margaret Tangeman and a son, Dr. H. F. Tangeman.

## ABSTRACTS

**Mitchell, L.** Sensitiveness of Iris to Atropin and Eserin. Australian Med. Jour. 1922, June 17.

Mitchell has made an investigation as to the sensitiveness of the iris to atropin and eserine. He used the iris of rabbits and dogs. The iris was removed from the eye, and either cut into radial segments, or used whole and placed in prepared solution at a temperature of 38° centigrade. To eliminate the occurrence of edema of the iris, it was dropped into serum obtained from the animal from which the eye had been excised.

He found that atropin ceased to act when the strength was less than one in 50,000,000. Eserine acted in a strength of one in 10,000,000. He pointed out that his experimental work throws no light on the method by which these drugs act on the eye, when dropped into the conjunctival sac.

**Mitchell, I.** Absorption of Ultraviolet Rays. Australian Med. Jour. 1922, Sept. 2.

Mitchell conducted a set of investigations into the absorption of ultraviolet rays by living tissues, spectacle glass and some physiologic solutions. The conclusions given are that flint glass is more efficient than crown, that Crookes' number 2 was the most efficient of all. Of the tissues of the eye, the lens was the most effective screen, and next to it was the cornea.

SIR JAMES BARRETT.

**Gjessing, Harald, G. A.** Electric Cataract, Examined with Gullstrand's Slit Lamp. British J. of Ophth. 1922, v. 6, p. 447.

About ninety cases of cataract resulting from lightning or electric current are mentioned in medical literature. Many of these have been carefully studied. However, only three cases have been studied with Gullstrand's slit lamp. The author's patient was a boy, aged 12 years, who was short-circuited by a 50,000 volt current, about one year previous to coming under observation. R.V.—5/12, L—fingers at 5 meters. The characteristics of the opacities were the confusion of cork-

screw shaped threads and laces, crossing each other in all directions without following the regular run of the lens fibers. The ribbons may be of greater thickness in the more advanced cases. The right lens showed an earlier stage. The threads had a veiled like appearance and were located immediately beneath the capsule. Deeper there were broader ribbons entwined and interlaced. In the meshes were fine and very glistening points. In the lens capsule were a number of round refractive cysts of different sizes. The contribution is a good discussion of the subject and contains references to the work of other investigators.

D. F. H.

**Van Duyse, Prof. D.** The Aspiration of Cataract. Le Scalpel, 1921, February 19th.

After stating the advantages of Barraquer's phacoerisis, Van Duyse gives the history of the aspiration of cataract. This seems to have been done first by Amar about the year 1000. He introduced into the anterior chamber a flattened hollow needle, and thru it sucked out the cataract. In the eleventh century, the Arabs also practised aspiration. The possibility of this method of removing cataract, used in the Orient, was due to the fact, that in that climate cataract frequently developed at an early age and was soft, or semifluid. The method of removal of cataract by aspiration was subsequently forgotten. Guy de Chauliac mentions it in the fifteenth century. It was reintroduced in Europe in the nineteenth century by Blanchet, who practised it at Paris in 1846, in cases of soft cataract.

DANIS.

**Leboucq.** Is There a Circulation of the Aqueous Humor? Royal Academy of Belgium, 1920, Oct. 30.

In his studies of the circulation of the intraocular fluids, Leboucq sought to demonstrate the existence of true currents in the anterior chamber. He studied the composition of the aqueous humor, the conditions of its forma-

tion and the changes in it following inflammation. He found a first proof of the existence of currents in the anterior chamber, in the ease with which changes in the composition of the aqueous were produced. He tried injections of fluorescein, and studied its mode of appearance in the anterior chamber, after ligation of the lymphatics of the neck in the rabbit. Such ligation produced miopia on the side ligated. The fluorescein appeared in the aqueous more generally diffused in the eye of the side not ligated. Leboucq thinks that the filtration is regulated by the sympathetic. He takes the affirmative on the question of the circulation of the aqueous humor, in this agreeing with Leber.

DANIS.

**Burdon-Cooper, J. Etiology of Cataract.** *British Journal of Ophthalmology*, 1922, v. 6, p. 385.

To the Doyme memorial lecture justice cannot be done in a short abstract. It should command attention in the original. Introductory and historical notations are made. Etiology includes pathology and pathogenesis. The commoner causes are known to us such as trauma, heat, cold, chemicals, electric discharge, refraction, general disease, certain drugs, etc. But our knowledge of the nutrition of the lens and its relationship to the composition and assimilation of the intraocular fluids is limited.

The various salts, albumin, globulin, glucose, urea, unorganized ferment contents of the vitreous are discussed. The osmotic pressure in relation to lental nutrition is an important question. The author studied surface tension in senile cataract, which term he prefers to osmotic pressure. The food of the lens is secured thru a modified endosmosis of the intraocular fluid, a molecular imbibition and, in all probability, a specific affinity of its protoplasm. Disturbance of this nutrition is the initial factor and cause of cataract, this interference resulting in secondary chemical changes producing opacities.

In senility the lens becomes increasingly sclerosed, changing its protein from soluble to insoluble albuminoids. The detection, in 1906, of the amino acid tyrosin, a cleavage product, led the author to the hydrolysis theory of primary cataract. The theory accounts for many changes in lental pathology:

1. The presence of tyrosin in the aqueous after needling the clear lens. Burdon-Cooper has found it after discission for myopia. The changes here are imbibition, decomposition, solution and abstraction by the aqueous, of soluble products—in short, the cataractous process.

2. Its presence in the aqueous and lens in senile cataract.

3. The findings in albuminuria and glycosuria. This is the only theory which accounts for black cataract and pigmentation of the lens generally, and for the diminished weight of the cataractous as compared with the clear lens of the same age.

It accounts for the more frequent position of the opacity in the cortex (subcapsular cataract being the most common form of senile cataract clinically), the nucleus often being quite free, the cortex hydrolysing more readily than the nucleus.

It accounts for the observation of Dor, that the lental albumin is much less and sometimes disappears, because it is hydrolysed and carried away by the aqueous.

In considering the pathogenesis of senile cataract, the author asks the question, is senile cataract a true disease, or is it simply incidental to age and a sign of decay? The question of refraction in influencing lens opacities is stressed. Irregular torsional accommodation efforts, which produce an irregularity in the lens shape, the author considers as a potent factor in lens opacities. The problem is further considered, in association with certain constitutional conditions, such as diabetes, the ingestion of drugs, such as ergot, naphthalin, etc., and the effects of heat and light. The contribution is accompanied by twenty-eight illustrations.

D. F. H.

**Merigot de Treigny. Metastatic Epithelioma of the Choroid.** *Ann d'Ocul.*, 1921, v. 158, p. 580.

The first patient had been operated upon almost a year before for carcinoma of the right breast. For about a month and a half, she had had some visual trouble. Examination of the right eye showed loss of central vision, with diminution of peripheral to perception of light. Decreased tension. Detachment of retina over a wide area, especially below, not well outlined, and wavy. About 6 o'clock, transillumination showed an indistinct cloudiness. The left eye showed, about 8 o'clock, a projecting area on the anterior surface of the iris, which was not a synechia, but a small growth infiltrating the iris. Central opacity of the cornea, reducing vision to 2/50. The fundus showed a detachment of the retina, smaller than in the right eye, which could not be made out well on account of the opacity. Transillumination slightly cloudy, about 6 o'clock.

The patient died suddenly, and the postmortem showed nodules in various localities in the body. Macroscopically, each eye showed a brownish tumor at the posterior pole of the eye, covered by the detached retina. Histologic examination showed that they were atypical epitheliomata of the choroid, with dense stroma surrounding a kind of alveolus, in which some epithelial cells were irregularly scattered. The tumors were intimately attached to the sclera on the one side, and on the other, the retinal pigment layer was adherent over the entire surface.

The second patient had an inoperable epithelioma of the breast, which produced metastases in spite of vigorous radium treatment. The left eye had vision of fingers at 75 cm., contracted visual field above and out. The fundus showed a large detachment of the retina, not involving the macula or the periphery. Enucleation under local anesthesia. The macroscopic examination showed a tumor surrounding the optic nerve, 2 to 5 mm. high. The retinal detachment was of much greater extent than the tumor. Microscopically, it was seen that the tumor

infiltrated the choroid, was adherent to the sclera and closely covered by the pigment layer of the retina. The tumor cells were grouped in irregular areas, and the stroma was scanty. The optic nerve seemed to have been strangled by the tumor, which in places invaded the nerve. The cells in places made a dissection of the nerve fibers.

The author reviews the literature, stating that women are most frequently affected; the age is about 44; the location is usually the posterior pole of the eye, and may be unilateral or bilateral. It takes the form of a disc, usually small and confined to the eyeball except in the last stage. The history is usually that of a tumor of the breast (operated or not), followed by disturbance in vision, usually of slow development, due principally to the retinal detachment. When the fovea is invaded, micropsia or macropsia may be present. Sometimes irritative symptoms appear. Objectively, if seen early, there is a yellowish prominence near the posterior pole. This is followed by a greater or less deposit of pigment, with increase in the size of the area. Later, this is followed by detachment of the retina, usually more extensive than in the case of a sarcoma. Tension may be normal, elevated or lowered. The diagnosis must be made between metastatic carcinoma and sarcoma, glioma, angiosarcoma and choroidal tuberculosis. C. L.

**Fracassi, G. Action of Glandular Extracts and Alkaloids on Pupils of Rabbits and Frogs.** *Arch. di Ottalmol.*, 1921, v. 28, pp. 154-203.

The author emphasizes especially the disagreement of previous writers as to the effect of *adrenalin* on the pupil, and also the scarcity of exact observations on the effect of other glandular extracts. He repeated the work which had been done on *adrenalin* and carried out similar experiments with a number of glandular extracts and a number of alkaloids. Besides the effect on the pupil, he noted especially the effect on the conjunctival vessels.

From a number of experiments with *adrenalin*, he noticed a constant *mydria-*

sis in rabbits and frogs, more marked by subconjunctival injection, but still fairly constant with instillation. Accompanying this was marked depletion of the conjunctival vessels, which lasted for a variable time. He draws special attention to the fact that the dilatation after subconjunctival injection begins in the sector of the pupil nearest the site of injection, later spreading to the other sectors.

Of the other glandular extracts tried, none produced any effect on the pupil by instillation alone. *Endothymin* and *pituintrin* both produced a *myosis* by subconjunctival injection, the latter more than the former. Nearly all glandular extracts produced conjunctival injection, and some produced chemosis with hemorrhage at the site of the injection. The author considers this may be due to the presence of a proteolytic ferment in the extract. The extracts tried were *endothyroidin*, *parathyroidin*, *endospermin* and *endoovarin* besides the two previously mentioned. None of these, including *endothymin* and *pituintrin*, had any effect on the pupils of frogs.

The alkaloids tried were atropin, arecolin, scopolamin, dionin, peronin, pilocarpin, morphin, cocain and nicotin. Of the myotics, eserin produced the most marked myosis and that of longest duration. The myosis of arecolin was more marked than that of pilocarpin, but not of such long duration. Of the mydriatics, atropin produced less marked mydriasis than scopolamin, but it was of longer duration. Dionin produced a slight but fugitive myosis. Nicotin produced intense myosis and very intense hyperemia.

In frogs, most of these alkaloids have no effect. Cocain, however, produced mydriasis, and arecolin a variable myosis. In experiments made to determine the effect of association of alkaloids and glandular extracts, it was found that *pituintrin* markedly increased the effect of adrenalin, but the congestive effect of *pituintrin* prevailed over the ischemic effect of adrenalin. *Endospermin* inhibited the action of adrenalin and *endothymin* in some experiments. The other glands had no effect on the action of adrenalin.

Cocain increased both the mydriasis and ischemia produced by adrenalin and also prolonged their action. The mydriasis produced by cocain alone was not by sectors as that of adrenalin, but when cocain and adrenalin both were used, the characteristic sector like dilatation was seen. The author interprets this as meaning that adrenalin completely paralyzes the neuromuscular connections between the sympathetic inhibitory fibers and the dilator muscles, allowing the latter to act on the muscles whose nerves have been paralyzed. Cocain apparently produced only weakening of these tonic nerve fibers and not paralysis. The author thinks the constant association of hyperemia with myosis and of ischemia with mydriasis is important as indicating a probable relation between the state of the iris vessels and that of the pupil.

S. R. G.

Léorat, L. *Rare Localizations of Diphtheritic Paralysis*. *Gaz. des Hôp.*, 1922, v. 95, p. 1157.

A part of the article deals with diphtheritic paralysis of the eye. Rolleston has found the ciliary muscle affected in 27% of cases of diphtheritic paralysis, and strabismus in 9%. Maingault found the ocular muscles affected in 49 out of 206 cases. Petit's statistics show 5 out of 34 affecting the eye, and 3 eye and palate, 1 eye, palate and paraplegia. Woodheat found strabismus in 197 out of 392 cases. The statistics of the Charité at Lyons for the years 1908-15 and 1919-22, according to the author, show 85 cases of paralysis. Of these, 7 affected the accommodation, 1 the iris, 1 the motor muscles of the eye.

Paralyses affecting the 3d, 4th and 5th nerves are late, appearing 15 to 20 days after the disappearance of the throat trouble. The most important symptom is diplopia, whose character depends on the muscle involved. In addition, affection of the 3d may show a ptosis, immobility and moderate dilatation of the pupil. Total ophthalmoplegia has been described, but never paralysis of the associated movements.

C. L.

**Block, F. Posttraumatic Tuberculosis of Eye.** *Klin. M. f. Augenh.*, 1921, v. 67, p. 581.

A man, aged 43, had rheumatism of the right knee, in 1916; and in 1917 a severe inflammation of the left eye which soon subsided under aspirin and drops. April, 1919, the right eye was injured by a piece of glowing iron. Diffuse opacity of cornea, hypopyon, pupillary margin adherent to the capsule of the lens. V=perception of movement of hand. Iris showed a small tear. June 30, the hypopyon was absorbed. July 4, intense local and general reaction to old tuberculin. After the treatment with new tuberculin and blue radiation, extraction of lens. Nov. 20, V. with correction 5/15. No analogous case has been described in the literature.

C. Z.

**Pichler, A. Whistling Thru Tear Passages.** *Klin. M. f. Augenh.*, 1921, v. 67, p. 623.

Pichler presented a man, aged 33, who upon Valsalva's experiment forced air into the left tear duct, which escaped from the lower punctum with a whistling noise, audible at several paces distant. If the eye was covered by an eye cup filled with fluid, the noise stopped, but numerous air bubbles ascended from the lower tear point.

C. Z.

**Favaloro. Verruca of the Palpebral Border.** *Arch. di Ott.*, 1922, v. 39, pp. 182-192.

The author divides verrucae into 1, Common papillary; 2, Flat juvenile; 3, Senile verruca and 4, Verruca of Peru. He points out the difference between the clinical aspects of warts on the extremities and those on the lids, where, on the thin, highly vascular skin, without the influence of external pressure, they grow freely in height and acquire a more distinctly papillary form than when on the extremities.

His case was a girl of eight, who for the past six months had shown a growth on the middle of the upper lid border. It increased in size and others developed beside it, so that when first seen by the author, a row of verrucae occupied the entire upper lid border and the outer 2/3 of the lower one. In all, there were twenty nodules of varying sizes composed of numerous pointed papillae. All were inserted at the roots of the lashes, many of which were turned out. In the lower lid the growths invaded the intermarginal space. In the upper lid all were on the upper edge of the lid border, and none in the intermarginal space. The growths were excised and their bases cauterized with copper sulphat, some being touched with the actual cautery. Healing was complete in a few days, and there has been no recurrence in two months.

Sections of the small nodules showed that they were round or triangular, with a few hair follicles at the base. The larger nodules showed a fimbriated form, being obviously older than the smaller ones. All were composed of a layer of cornified epithelium, (one to three rows of squamous epithelium) a malpighian layer, (seven to eight rows of polyhedral "prickle-cells"). Beneath this is the basal layer of cylindric cells, and below this the dermis. All of these layers were as found in normal skin, except the malpighian which showed active hyperplasia. Bacteriology showed only staphylococcus albus and B. xerosis.

The author believes in the contagiousness of verruca, and that in his case the child had infected his lid from his fingers, and from this focus the other warts had developed. He concludes that simple warts should be treated early, by excision, the ordinary cauterants being ineffective. In larger ones the base should be cauterized.

S. R. G.

## NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu; Dr. E. B. Cayce, Nashville, Tenn.; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. Edward D. LeCompte, Salt Lake City.

### DEATHS

Dr. Charles H. Ansley, New Orleans, aged 49, died October 3rd from pernicious anemia.

Dr. Charles C. Bernard, Chicago, aged 66, died from pneumonia October 29th.

Dr. G. Erwin Brinckerhoff, Oakland, California, aged 60, died October 3rd from angina pectoris.

Dr. Henry E. Greene, Crawfordsville, Indiana, aged 55, died October 2nd from chronic nephritis.

Dr. Charles L. Holt, Bellingham, Washington, aged 83, died October 14th from cerebral hemorrhage.

Dr. James W. Ingals, Brooklyn, N. Y. died at his home September 28th.

Dr. Maurice Krebs, Huntington, Indiana, died August 7th following a tonsil operation.

Dr. Herman E. Molzahn, St. Paul, Minnesota, died from heart disease, November 1.

### PERSONALS

Dr. Charles Maghy, formerly of San Diego, has located in San Francisco.

Drs. A. S. and L. D. Green have moved into their own building at Hyde and Bush Streets, San Francisco.

Melaine Lipinka, a blind physician from Poland, arrived in New York, September 29th. She will carry on experimental research work for the blind.

Dr. Clarence Loeb, of Chicago, has been promoted from Associate, to Attending Ophthalmologist, on the staff of the Michael Reese Hospital.

Drs. Harry Vanderbilt Würdemann and John Howard Harter have formed a partnership for the practice of Ophthalmology and Oto-Laryngology in Seattle.

Dr. Cassius D. Wescott announces that his son, Dr. Virgil Wescott, is associated with him in practice, 22 E. Washington Street, Chicago.

Dr. G. I. Hogue, Milwaukee, has been promoted to the grade of Colonel Medical Officers Reserve Corps, and assigned to command of the 326th Medical Regiment, 101st Division.

Dr. R. H. Braunlin of Marion, Indiana, has moved to Huntington, Indiana, taking

over the practice of the late Dr. Maurice Krebs. He will limit his practice to the eye and ear.

Dr. Casey Wood returned from England the last of September. After a month's stay in Chicago, he has gone to California, where he will spend the winter months continuing his research work in comparative ophthalmology.

Dr. Casey Wood heard his first nightingale in the South of England, where the famous bird at times is to be found. We can well imagine that the enthusiasm which filled this diligent seeker after Nature's loveliest song was like that of an ardent soul which attains the rare aim for which it seeks. It is a pity that Dr. Wood can not bring to us the lovely thing of which the rural Briton seems to have a monopoly. It would be a wonderful use of the radio telephone if some quiet evening, when all the world is settling down to rest and jazz has forsaken the ether, we might hear, as it comes from the air across the intervening miles, the song of a nightingale. Scientists may produce practical results, but certainly nothing more strange or satisfying.

### MISCELLANEOUS

The government of Venezuela has opened a hospital for the free treatment of diseases of the eye, ear, nose and throat.

A department for the administration of massage and other forms of physical therapeutics has recently been opened by the Canadian Institute for the Blind.

A medical officer from the field staff of trachoma experts of the U. S. Public Health Service will shortly be detailed to make a survey of the trachoma situation at Anna, Illinois.

The new \$125,000 gymnasium of the Colorado School for the Blind, Colorado Springs, it has been decided to name in honor of Postmaster-General Work, who is from Colorado, and has been an active worker for the institution.

The courses on the education of the blind, given during the past two years in the Graduate School of Education of Harvard University, have proved so successful that they have become a recognized part of the curriculum.

The "Monthly Bulletin of Labor and Industry" gives a summary of industrial accidents for the first six months of 1922. During this period three-hundred and five eyes were lost. The award for eye losses was twice as great as any other award for permanent injury.

If you are not receiving the "News Letter", send in your name to the National Committee for the Prevention of Blindness, 130 East Twenty-second Street, New York City. We are sure that you will be surprised and pleased to know about the good work this committee is doing.

"National Safety News" states that a Pittsburgh steel corporation employing eight-thousand men, reports that the use of goggles is found to prevent from twenty to twenty-five cases of possible loss of vision annually, with a direct saving of from \$50,000 to \$60,000 a year in compensation.

The eighth annual meeting of the National Committee for the Prevention of Blindness was held in the Russell Sage Foundation Building, New York City, on November twenty-third. Miss Helen Keller, Honorary Vice-President, was to be present and to speak at the meeting.

The latest figures of the war blind entitled to government compensation are 636. Of these, 311 are totally sightless and 325 are partially blind. Training had been given to 242 of the war blind at Evergreen prior to December, 1921, when the Institute was turned over to the Veterans' Bureau.

The two courses previously announced to be given at the Summer session of Columbia University, were so successful it is believed they will be regularly offered hereafter. The course for training workers with the blind registered seventeen students; that for training teachers for the conservation of vision twenty-one.

The foreign Language Information Service is making it possible for immigrants who have not yet learned the language of their adopted country to read in their newspapers the best way of preventing disease and of conserving health. During August, eighteen articles on the care of the eyes appeared in the Ukrainian, Lithuanian, Finnish, Czech and Slovak languages.

It is stated: Three years ago, Augustine F. Massa, who is blind, was denied admission to Columbia University because of the belief that his handicap prevented him from attaining required scholastic standards. He persuaded authorities to give him a trial, and soon proved his ability to keep pace with other students.

Today he is enrolled in the College of Law and holder of one of three scholarships the college offers. He also is active in student organizations, expert at chess

and checkers, and a member of the varsity wrestling squad.

#### SOCIETIES

An advisory committee, made up of physicians, oculists and optometrists, has been appointed for the bureau of trachoma and conservation of vision of the state board of health of Kentucky. Dr. Gaylord C. Hall, Louisville, is chairman.

At the November meeting of the Chicago Ophthalmological Society, papers were read by Dr. Alan C. Woods of Baltimore, on "The Immune Reactions of Uveal Pigment and Their Clinical Significance" and by Dr. Ludwig Hektoen, Chicago, on "Immune Reactions of the Lens."

The Eye and Ear Section of the Kentucky State Medical Association held its annual meeting in Paducah, September sixteenth. The meeting was well attended. One of the features of the program was The Report of Three Cases of Subconjunctival Dislocation of the Crystalline Lens, by Dr. T. Liggett Bailey of Madisonville. All of these cases had been observed by him in his own community in a comparatively short time.

The officers for the ensuing year are as follows: H. G. Reynolds, Paducah, President; T. Liggett Bailey, Madisonville, Vice-president; I. A. Lederman, Louisville, Treasurer; Gaylord C. Hall, Louisville, Secretary. Dr. S. G. Dabney, the retiring President, was elected to a place on the Council made vacant by the expiration of the term of Dr. J. A. Stucky.

The first scientific session of the Brooklyn Ophthalmological Society was held October 19, 1922 at 1313 Bedford Ave., Brooklyn, N. Y.

Twenty-four applicants were elected to membership making the total Charter Membership Fifty-four.

Dr. James Bilello presented an interesting case of perforating tumor of the globe. Dr. John Ohly reported a case of tumor of the globe, which macroscopically showed no signs of perforating, but microscopically revealed small sarcoma cells on the outside of the globe.

The speaker of the evening was Dr. Harry S. Gradle, of Chicago, Ill., who spoke on "Clinical Demonstration of the Optics and Use of the Gullstrand Slit Lamp." Dr. Gradle illustrated by lantern slides the construction of the lamp and corneal microscope, and spoke of their use both for anterior bulbar conditions and for fundus examination, explaining the difficulty of the latter, but commending its use for corneal, iritis, and lenticular examination. He then demonstrated the lamp in operation by use of several interesting cases presented by the members.

## Current Literature

These are the titles of papers bearing on ophthalmology received in the past month. Later most of them will be noticed in Ophthalmic Literature. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-face type**. The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is an abstract of the original article. (Bibl.) means bibliography and (Dis.) discussion published with a paper. Under repeated titles are given additional references to papers already noticed. To secure early mention, copies of papers or reprints should be sent to 217 Imperial Building, Denver, Colorado.

### DIAGNOSIS.

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- Repeated titles. Arlt. (A. J. O., 1922, v. 5, p. 988) Intern. Med. and Surg. Survey, 1922, v. 4, (8a-341). Seidel. (A. J. O., 1922, v. 5, p. 933) Intern. Med. and Surg. Survey, 1922, v. 4, (8a-429).

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